

FLIGHT

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AIRCRAFT ENGINEER
AND AIRSHIPS

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

- 1932
- Feb. 20. Rugby: R.A.F. v. Coventry, at Coventry.
- Feb. 22. British Gliding Association, Annual General Meeting.
- Feb. 24. "A Flight to Abyssinia," Lecture by Sqdn.-Ldr J. L. Vachell, before R.U.S.I.
- Feb. 24. Rugby: R.A.F. v. United Bank, at Ealing.
- Feb. 25. "Catapults," Lecture by P. Salmon before R.Ae.S.
- Feb. 25. Football: R.A.F. v. Kent at Margate.
- Feb. 29. "Flying Boats on Commercial Air Routes," Lecture by C. H. Jackson, at City and Guilds Eng. College, S. Kensington.
- Mar. 1. "Some Problems connected with High-Speed Compression-Ignition Engine Development," Lecture by C. B. Dicksee before R.Ae.S.
- Mar. 2. "Motorless Flying," Lecture by E. C. Gordon England, before Roy. Soc. Arts.
- Mar. 4. Leicestershire Ae.C. Annual Ball.
- Mar. 5. Lloyd's Register Cricket Club Annual Reunion and Dinner, May Fair Hotel.
- Mar. 5. Rugby: Army v. R.N., at Twickenham.
- Mar. 9. Rugby: R.A.F. v. Oxford University, at Oxford.
- Mar. 10. "Results with the New Wind Tunnel at N.P.L.," Lecture by E. F. Relf, before R.Ae.S.
- Mar. 16. "Development of Naval Air Work," Lecture by Commodore N. F. Laurence, before R.U.S.I.
- Mar. 23. "High-Speed Flying," Lecture by Sqdn.-Ldr. A. H. Orlebar, before R.U.S.I.
- Mar. 24-28. London Gliding Club's Meeting at Dunstable.
- Apr. 1. Entries close at ordinary fees for King's Cup Race.
- Apr. 2. Rugby: Army v. R.A.F., at Twickenham.
- Apr. 2-10. National Aircraft Show, Detroit, U.S.A.
- Apr. 7. "Wing Construction," Lecture by H. J. Stieger, before R.Ae.S.
- Apr. 13. "The North-West Frontier of India," Lecture by Maj.-Gen. S. F. Muspratt, before R.U.S.I.
- Apr. 14. "Aero Engine Accessories," Lecture by W. L. Taylor, before R.Ae.S.
- Apr. 21. "Air Port Development," Lecture by N. Norman, before R.Ae.S.
- May 1. Entries close at double fees for King's Cup Race.
- May 15. Skegness Air Pageant.
- May 18. Household Brigade Flying Club Meeting, Heston.
- May 22-30. Conference of Transoceanic Aviators at Rome.
- May 28. London-Newcastle Air Race for "Newcastle Evening World" Trophy.
- May 28. Brooklands Meeting.
- June 4. Bristol Airport Summer Flying Meeting.
- June 18. Hull Air Display.

EDITORIAL COMMENT



THE future of the air route down the Persian Gulf is an extremely important matter, and the position regarding it at the moment is very interesting. The present agreement with the Persian Government expires in April, and a report has come through from Teheran that the Shah's Government does not intend to renew it. On Wednesday last Mr. O. E. Simmonds tried to extract some information on the subject from the Under-Secretary of State for Air, but the only answer given was that negotiations with the Persian Government are still in progress, that alternative proposals are also under active consideration by His Majesty's Government, but that at the present juncture "My noble friend" was not in a position to make any further public statement on the subject.

The history of the Persian Gulf air route is not too happy. On December 27, 1926, the then Air Minister, Sir Samuel Hoare, set off with a party from Croydon, at an unpleasantly early hour, to open the new Imperial Airways route to India by flying there in a "Hercules." Despite a rather narrow escape from disaster through a sandstorm at Jask, the flight was quite a success. But, after the cheering and the shouting had died, it was realised that the Persian Government had not given permission for Imperial Airways to make regular use of the aerodromes down the Persian shore of the Gulf. Great Britain was left high and dry, and looked considerably foolish. Long negotiations continued, and we heard the opinion expressed that things would probably have gone much better if the matter had been placed in the hands of the experienced diplomats of the Foreign Office. The Air Ministry could only bring a 'prentice hand to bear in these international negotiations, and perhaps for that reason they were unduly protracted. The days of Kipling's A.B.C. (Aerial Board of Control), which can regulate the traffic of the world, are not yet. It may, or may not, be the destiny of the Air Ministry to swallow up the Admiralty and the War Office, but until the A.B.C. comes into being it is probable that the

Foreign Office will remain the best medium for conducting negotiations with foreign countries. Whether the present negotiations are being conducted by the Air Ministry or the Foreign Office we have no sure information, but the reply of Sir Philip Sassoon suggests that the Air Ministry is still carrying on.

We are sometimes told that air transport tends to abolish national boundaries, that air routes ought all to be internationalised, and such like. Probably all that will come about when the League of Nations has brought about a premature millennium, though even then we personally shall retain a prejudice in favour of a British certificate of airworthiness, the British A.I.D., and British pilots. In the meantime, while the iniquity of nationalism continues, we are strong believers in making our "All-Red" routes as red as possible. It is bad enough to have to bargain for leave to fly across a European country; it is still more trying to the patience when the same bargaining has to be done with an Asiatic Power; though the hardest nut of all to crack is the Government of British India. Wherever it is possible we ought to arrange that the landing-places on our Empire air-routes are on ground which is either British or very much under British influence. With the future of airships still dubious, the best way to achieve that object is to use the flying boat, and to go on developing the flying boat and fitting it to do more and more of our Empire work. Sometimes the stages will be such that the use of flying boats will be hopelessly uneconomic, and then we must cut our coat according to our cloth. In other cases, though the use of a flying boat may allow less direct profit than could be obtained from a landplane using foreign aerodromes, there may be advantages on the side of the boat which would make it worth while for the Government to subsidise the over-water route and still gain on the deal. It seems very probable that the Persian Gulf is a case in point. In fact we think it quite possible that the British Empire as a whole will be a gainer in various ways if the Persian Government does actually refuse to renew its concession to Imperial Airways.

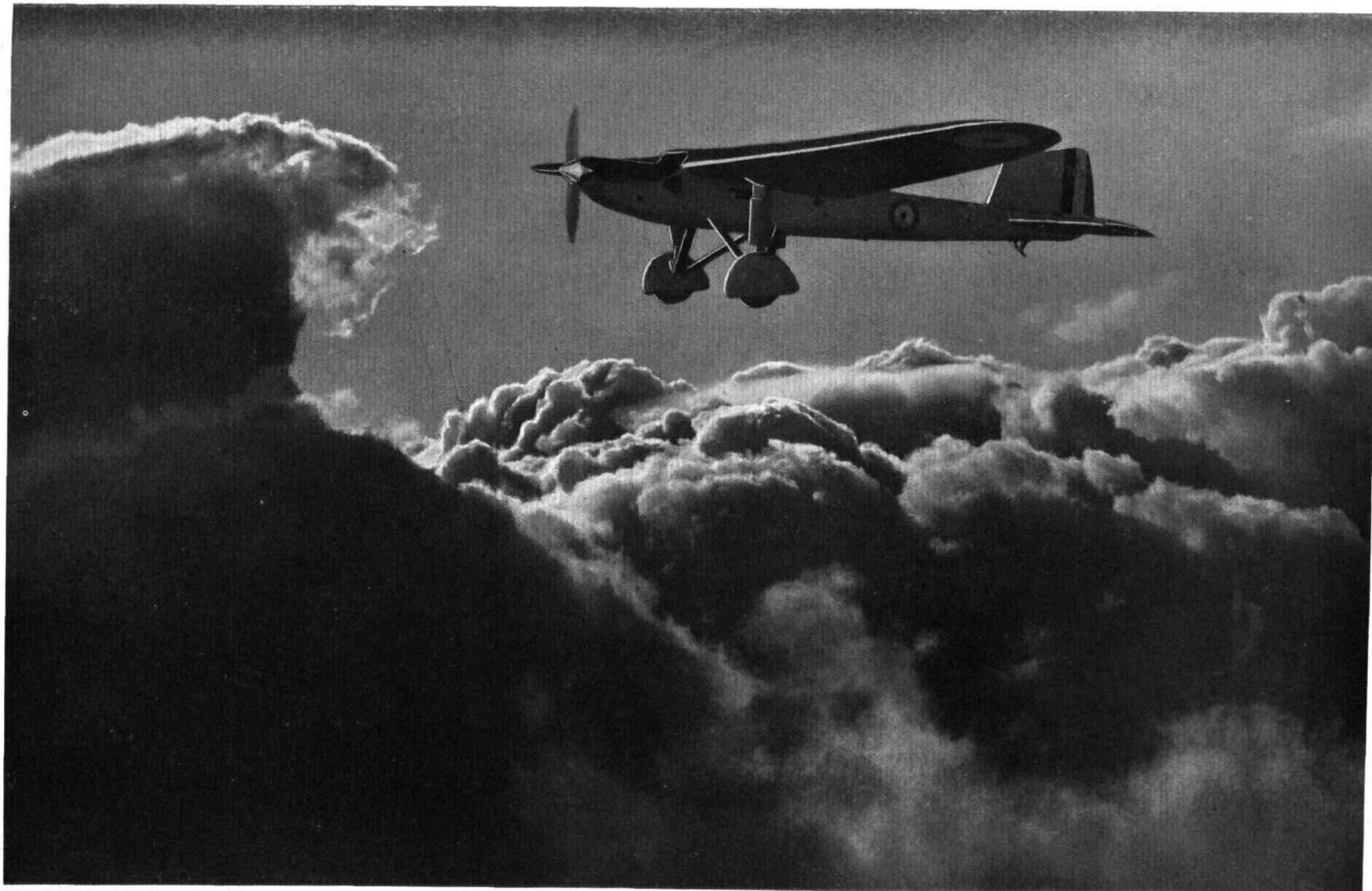
The alternative is to follow the Arabian, or western, shore of the Gulf. These shores are low-lying deserts, in contrast to the rugged mountains which descend almost to the water's edge on the Persian shore. The sheikhs who rule the various territories of the desert all along the coast from Koweit in the north to Ras-el-Khaimah, near the Strait of Ormuz, are all in close relations with the British Empire. The most important of them are the Sheikhs of Koweit and Bahrein, two towns which are each the seat of a British political agent and consul. Farther to the east lies a tract with the ominous name of the Pirate Coast. It was once a very dangerous part of the earth, but now all the tribal chiefs have entered into treaties with the Indian Government which forbid piracy and sea fighting, and which have earned for the sheikhs the title "Trucial Chiefs." So far as the political side of the question is concerned, there would be no

difficulty in arranging for Imperial Airways to fly along that coast.

Of the suitability of the coast for the operation of landplanes, we have little information. One thing is certain, namely, that overland the distance is very much greater than the distance along the Persian shore. Moreover, the central Power in Arabia may not always be friendly, and the chiefs might not be able to prevent that Power from attacking land stations, or capturing aeroplanes which might have been forced to land. Koweit is safe enough, for it is within easy range of the R.A.F. aerodrome at Shaibah, near Basra, while Bahrein is also safe because it is an island. If the danger zone were reduced to the Pirate Coast it ought not to be so very difficult for us to make adequate arrangements for its protection. But in any case the flying boat would be the best type of aircraft to use along this coast. Unlike some low-lying coasts, it is well indented with bays and inlets, some of which ought to afford good anchorage. From Bahrein island across a large bay to the northern point of the Pirate Coast is a stretch of some 350 miles. Another stretch of about the same length would take the boat to the territory of Baluchistan, which is also under British influence. There is no problem there which a boat of the endurance of the "Kent" could not solve with ease.

A flying boat service down the Arabian coast is a prospect which is attractive from many points of view. It would, for one thing, provide a stimulus for the further development of commercial boats. It would be attractive to passengers, for there are some ways in which flying in a boat is even more pleasant than flying in a landplane. It should add to safety, though the present landplane service has certainly proved safe enough, for a boat flying over water always has a landing ground below it. It would also be free from interruption through the lack of goodwill of a foreign country. In addition to all that, it would open up a route which would be available for the R.A.F. flying boat squadron at Basra. There might be a certain amount of quibbling with the Disarmament Conference as to whether such a route ought to be subsidised if it is useful for military purposes; but we do not think that this objection need be taken too seriously. A more important consideration would be that, with the disappearance of the landplane route between Iraq and India, it would no longer be possible to send reinforcements of, say, troop-carriers to India in case of emergency, as was done when the foreigners were evacuated from Kabul. But we must remember that the passage of R.A.F. landplanes was as dependent on the goodwill of Persia as is the passage of Imperial Airways machines now. It is not inconceivable that some day both Persia and Afghanistan may fall under the influence of Soviet diplomacy, and then our communications would be cut at a moment when our need was most urgent. It will, on the whole, be a good thing to free ourselves of this dependence, and resolutely make up our minds to develop a flying boat route down the Arabian coast for the use alike of Imperial Airways and the Royal Air Force.





READY FOR THE "LONG HOP": An impression of the Fairey (Napier) long-range monoplane as Dore might have recorded it had he been Flight Staff Photographer. If weather conditions are favourable a start for the 6,000-mile non-stop flight to the Cape will be made at dawn to-day. (FLIGHT Photo.)

GERMAN AIR UNION'S TWO STANDARD PLANES FOR HOME CONSTRUCTION

By EDWIN P. A. HEINZE

THE German aviation clubs are handicapped compared with those of other nations by having to rely entirely on their own means for the acquirement of aircraft. Owing to the Peace Treaty, the German Government is not allowed to subsidise the clubs. This, naturally, is a heavy drawback to the whole movement, but it cannot quench the enthusiasm of German youth. For some years past now the German aviation clubs have successfully built their own gliders and sailplanes, and the experience in handicrafts thus obtained has encouraged the German Air Union, with which the majority of clubs are affiliated, to develop motor-driven machines, which the club members can build in their club workshops. Last year the Union held a design competition intended to develop a single-seater practice aircraft, and two of the most promising designs were adopted and have now been completed by the designers under the auspices of the Union. The trial machines were demonstrated for the first time at the Central Airport of Berlin before members of the Press on February 9, and created an exceedingly good impression. The designers are the well-known sailplane constructor Mayer, formerly assistant tutor at the Aachen College of Engineering (now tutor at the Stettin College of Engineering) and a group of students at the Berlin College of Engineering.

The plane designed by Mayer is a robust structure entirely built of wood. It is remarkable to note that both Mayer and the student group have selected as the most suitable type of machine a parasol monoplane with strut-braced wings. Whereas the Berlin student group, however, has designed a rather elegant machine of considerable aerodynamical merits requiring no little skill in the making, Mayer has purposely designed his plane along somewhat rougher lines, keeping in mind primarily ease of construction and avoiding all parts requiring particular skill or experience. The wing of his machine has the same section all through, so that a single jig will serve to construct all ribs. Also the wing has the same camber below as above, i.e., it is symmetrical, so that, incidentally this machine, given an engine of about 40 h.p., is fully capable of stunt flying, inverted flying, etc. The wing consists of two sections, which can be taken down and hung up on the side of the fuselage, where special fittings are provided for this purpose. Owing to the double camber, the wing is very stiff. It has one spar and, except for the trailing edge, it is covered with veneer, the trailing edge and ailerons being fabric covered.

Handicapped by lack of funds, German light plane clubs have held a competition for designs for machines suitable for construction by club members. Two such designs have now been approved, and the machines are described below

Curious also is that both Mayer and the student group, working entirely independent of one another, have adopted almost exactly the same type of fuselage, which has hexagonal section, and is entirely made of wood. The hexagonal form is aerodynamically very good, as it gives the machines a slim shape. Also it offers good possibilities for fixing the under-carriage and *empennage*. The wing portions are secured, in Mayer's plane, to a ridge on top of the fuselage. The cockpit is arranged behind the wing, and from it excellent vision is obtained, both the landing wheels being fully visible, while, if the pilot slightly raises himself in his seat, he can easily look over the wing and see straight ahead. This is one of the reasons why this type of monoplane has been chosen, another being that it is more easily controllable in the event of a spin. The wing struts consist also of wood, as club members have more experience in wood-working than in the manipulation of metal. The wing has a span of 32.8 ft., an area of 134½ sq. ft., and the plane weighs, including equipment and the two-cylinder Mercedes engine of 20 h.p. output now mounted, 627 lb. It is capable of taking a load of 220 lb., and its full flying weight, therefore, is 847 lb. A larger engine of 35 to 40 h.p. output, now being prepared by a leading German engine maker, can be fitted. In this case, however, the rather long nose part of the plane would have to be shortened, which would give it a more pleasing appearance, although its present looks are by no means displeasing.

In point of appearance, the second plane, developed by the student group, is rather superior. As already indicated, the details of this machine are more finely worked out. It requires more care and skill to build, and is not quite so robust. The wing consists of three sections, the middle one being fixed over the fuselage, while the side portions are pivoted so that they can be swung back against the fuselage. The struts are of steel. To give the pilot a good view, the centre section has a shorter chord than the end sections, the reduction in lifting surface being compensated by an increased angle of incidence. The wings have two box spars, which are joined at their lower surface by plywood. The usual internal bracing is dispensed with, its place being taken by two simple box ribs in the end sections. For the rest, the wing has fabric skin.

The span of this machine, which has the same size and type of engine as the other, is 29½ ft., and its lifting area 107.6 sq. ft. The weight only amounts to 407 lb. and,



THE AKAFLIEG MACHINE: Designed by the Akademische Fliegergruppe, Berlin, this monoplane is slightly more difficult to construct than the Mayer design.

THE MAYER DESIGN: Owing to the low weight of the engine, the nose of the machine is rather disproportionately long.



like the other machine, it will take a load of 220 lb., including 33 lb. of fuel and a parachute.

Performance figures have not yet been ascertained, because neither of these machines has yet completed the official tests.

On a fair estimate, however, the speed of Mayer's plane amounts to about 72 m.p.h. and that of the student group to 78 m.p.h. with the small engines now fitted. The machines are, in the first place, intended for practice flights over the home ports of the clubs, and,

therefore, high speed is not essential. Two-seater planes for home construction are soon to be developed by the German Air Union, too, so that clubs will at no distant date be able to come cheaply in possession of badly-needed aircraft.



THE P.B. SCARAB

AN interesting aircraft most suitable for private owners who wish to fly economically has been built by the Royal Aircraft Establishment Aero Club. Some two years ago we saw this machine when it was in its embryo state and were impressed with the ingenuity with which existing materials and parts were being utilised to build this little aeroplane. It will be seen that it is a high-wing folding monoplane, very reminiscent of the Westland Widgeon, and has been designed with the idea of providing an excellent view, low



Type — High wing

| | |
|-------------------|----------------|
| monoplane ... | Single-seater. |
| Wing span ... | 30 ft. 0 in. |
| Chord ... | 4 ft. 6 in. |
| Wing area ... | 127 sq. ft. |
| Length overall... | 21 ft. 0 in. |
| Height ... | 6 ft. 9 in. |
| Undercarriage ... | Split. |

| | |
|--------------------|-------------------------|
| Track ... | 5 ft. 0 in. |
| Engine ... | Bristol Cherub Mk. III. |
| H.P. ... | 32 at 3,200 r.p.m. |
| Weight loaded... | 650 lb. |
| Top speed ... | 78 m.p.h. |
| Stalling speed ... | 32 m.p.h. |
| Climb ... | 600 ft. per min. |



landing speed, good take-off and pull-up. The control surfaces are large and the control below the nominal stalling point is good. Those directly concerned with the design and construction are: Messrs. P. Peters, C. Brewer (design and stress calculations), M. Harris, J. Young and W. Baker, while the initial flight test was made by F/O. H. H. Leech. The R.A.E. Club are to be congratulated on producing such an eyeable and suitable aircraft for the more impecunious private owners.



The Couzinet-Gipsy

In our issue of January 22, 1932, we published a photograph of the new Couzinet three-engined monoplane fitted with de Havilland Gipsy III engines. This machine has now done a considerable amount of flying, and the top speed appears to be in the neighbourhood of 230 km./h. (143 m.p.h.), so that it is expected that the cruising speed will be about 120 m.p.h. The machine is, as we have already announced, to be used for a long-

distance flight, crewed by de Verneilh, Devé and Munch. When equipped for long-distance flying the machine will carry 440 gall. of petrol, which is expected to give it a range of about 1,860 miles. The first long flight contemplated will be from Paris to New Caledonia, via Cairo, Basra, Karachi, Calcutta, Rangoon, Batavia, Sourabaya, Port Darwin, Camooweal, Brisbane and Noumea. The last "hop" will be one of 930 miles. Now one understands why "Gipsy" engines have been fitted!

Airport News

CROYDON

OUR taste of real winter during this last week has not been very greatly appreciated by some of us unfortunate people at Croydon. Although full services have been maintained, flying through blinding snowstorms has been far from pleasant, and the ground staff have been nearly frozen stiff at times, having to work outside in a biting easterly wind which seemed to have no mercy on a poor person's ribs. Now the thaw has set in, however, we can once again work in a little more comfortable conditions. This snow stuff is very nice when one can spare the time to use it to advantage, but for the people who have to carry on their daily routine in it, the best place for it is on picture postcards. Imperial Airways are having a great amount of compass trouble on their Argosy G-AACJ. It will be remembered that last summer, whilst flying through a thunderstorm, the whole of the machine became magnetised, and since then this compass trouble has always been evident. To overcome it they have now transferred the whole nose of G-AACI to G-AACJ to see if that will have the desired effect. This defect is all that is keeping this machine off service now, as she has just come out from a complete overhaul. The only machine unable to make Croydon during the week on account of the snow was an incoming "Sabena," which made a forced landing near Merstham. The pilot must have struck a very bad patch, as everybody else managed to scramble in, although the visibility at times was nil. The erection of the radio beacon is now well advanced,

the main mast having been completed. This stands on the west side of the aerodrome, and is 100 ft. high. Gambling is rife on the point of who will be the first to knock the top off. It looks like a miniature Eiffel Tower, and tapers up to practically a point.

Sabena Air Lines have decided not to operate their night service this year, with the consequence that they are reducing their staff. Deutsche Luft Hansa will, however, operate their usual summer night service, I understand, which commences somewhere toward the end of March or the beginning of April. Last season they put up a very fine show, and no doubt they will do the same this year.

The main road past the aerodrome entrance is becoming famous for crashes, and hardly a week passes without seeing two or three cars twisted to an unrecognisable degree. It would be no exaggeration to say that there are more crashes on Purley Way with cars in a month than there are on this aerodrome in two years, and yet some people still regard aeroplanes as dangerous vehicles. To-day's slogan might well be, "Travel by air, speed with safety; travel by road, speed full of danger."

Captain George Endres, the Hungarian airman who in July of last year flew non-stop from Harbour Grace, Newfoundland, to Hungary, paid a visit of inspection to Croydon aerodrome on February 13.

The traffic figures for the week were:—Passengers, 502; freight, 31 tons.

P. B.

Effort to Open New Customs Airport

A DETERMINED effort to have the aerodrome of Iona National Airways, Ltd., at Finglas, County Dublin, appointed as the Customs aerodrome for the Irish Free State is being made by the directors of that company. The area of the aerodrome is being enlarged to 50 acres

and will provide runways of at least 600 yd. in all directions. Representations have already been made to the Free State Department of Industry and Commerce to approve the aerodrome for Customs purposes, and it is expected that some decision will be given within the next week or so.

The Prince Flies to his Regiment

ON February 16 the Prince of Wales flew to Bordon Camp, Hants, to inspect and bid farewell to the 1st Battalion of the Royal Scots Fusiliers, of which he is Colonel-in-Chief, on the eve of their departure for Palestine. The day before the Prince flew from Sunningdale to hunt with the Quorn from Hoby, Leicestershire.

Death of Sir Arthur Duckham

WE regret to announce the death, at his home at Ashted, Surrey, on February 14, of Sir Arthur McDougall Duckham. Sir Arthur, who was 52, was president-elect of the Federation of British Industries, and during the war was a member of the Air Council and Director-General of Aircraft Production. He was also a director of A. Duckham & Co., Ltd.

The Paris Aero Show

FOR the benefit of British firms which may be contemplating taking space in the 13th International Aero Show to be held in Paris from November 25 to December 11, we would point out that the new address of the Syndical Chamber of Aeronautical Industries (which corresponds to our S.B.A.C.) as well as that of the Commissaire Général of the Exhibition, is at 4, Rue Galilée, Paris (16), to which address all communications in connection with the exhibition should be addressed.

The Disarmament Conference

AT the Disarmament Conference the American delegate made proposals on practically the same lines as those made by the British. The Italian delegate, Signor Grandi, made more radical proposals, which include the abolition of capital ships, submarines, aircraft carriers, heavy artillery, tanks, bomber aircraft and all chemical and bacteriological warfare.

The Airship Staff

THE Under-Secretary for Air, in reply to a question in the House on February 10, stated that a nucleus staff of one airship pilot, a technical officer and the necessary clerical and other assistance, is being maintained at Cardington under the Superintendent of the Royal Airship

Works for experimental work and for supervising and correlating such airship research as is proceeding and contemplated, and for watching foreign developments.

Helium Research in Canada

THE Dominion Department of Mines has just issued Mines Branch Report No. 727 (Section 2) by Mr. P. V. Rosewarne, entitled "Helium in Canada from 1926 to 1931." The publication in question gives data relative to research work done by the Department of Mines since the issue in 1926 of Dr. R. T. Elworthy's report on "Helium in Canada." Data are given as to the analyses of samples taken from natural gas wells in Alberta, Nova Scotia, New Brunswick, Quebec, Ontario and Saskatchewan, and a summary of the available supply in 1926 suggests that 5,165,000 cub. ft. per annum of Helium may be recoverable. Since 1926 the number of wells producing natural gas in Alberta has been greatly increased—though in recent months efforts have been made to bring about some measure of conservation owing to the immense wastage of natural gas, particularly in the Turner Valley.

Yet another Autogiro Licensee

FROM America comes news that the Autogiro Company of America has recently granted licence to construct Autogiro aircraft to the F. W. Steere Company. Mr. Steere, head of the concern, purchased an Autogiro in 1931 and piloted it a good deal on difficult cross-country flights in order to get first-hand evidence of its capabilities. His decision to enter the field of Autogiro construction was taken largely as a result of the feeling of safety and ease of handling which he had experienced during these flights, and Mr. Steere will establish his Autogiro factory somewhere in the Middle West. Technical head of the concern will be Mr. Heraclio Alfaro, who learned to fly in France in 1911 and built aircraft in Spain in the early days. The F. W. Steere Company will be the fourth to construct Autogiros under licence, the other three being the Buhl Aircraft Co. of Michigan, the Kellett Aircraft Corporation of Philadelphia and Pitcairn Aircraft, Inc., of Willow Grove, Pennsylvania.

THE ROYAL AERO CLUB OF THE UNITED KINGDOM

OFFICIAL NOTICES TO MEMBERS

REPORT of the Meeting of the Committee of the Royal Aero Club, held at 119, Piccadilly, W.1, on Wednesday, February 10, 1932, at 5 p.m.

Present:—Lt. Col. M. O’Gorman, C.B., in the Chair; Com. James Bird, O.B.E., Lt. Col. M. O. Darby, O.B.E., W. Lindsay Everard, M.P., Maj. A. Goodfellow, Lord Gorell, C.B.E., M.C., Col. F. Lindsay Lloyd, C.M.G., C.B.E., F. Handley Page, C.B.E., Maj. H. A. Petre, D.S.O., M.C. In attendance, H. E. Perrin, Secretary; B. Stevenson, House Secretary.

Election of Members.—The following Members were elected:—

Maj. Gilbert Samuel Baynes, Bruce Munro Davison, Roger Montgomery Fuller, Edgar William Hart, Stanley Charles Huggett, Ian Charles MacGilchrist, Howard Clive Mayers, Charles Minto Needham.

King’s Cup Air Race, 1932.—The recommendations of the Racing Committee were unanimously adopted. The recommendations were as follows:—

Date.—Friday and Saturday, July 8 and 9, 1932.

Starting and Finishing Place.—Brooklands Aerodrome.

Course.—

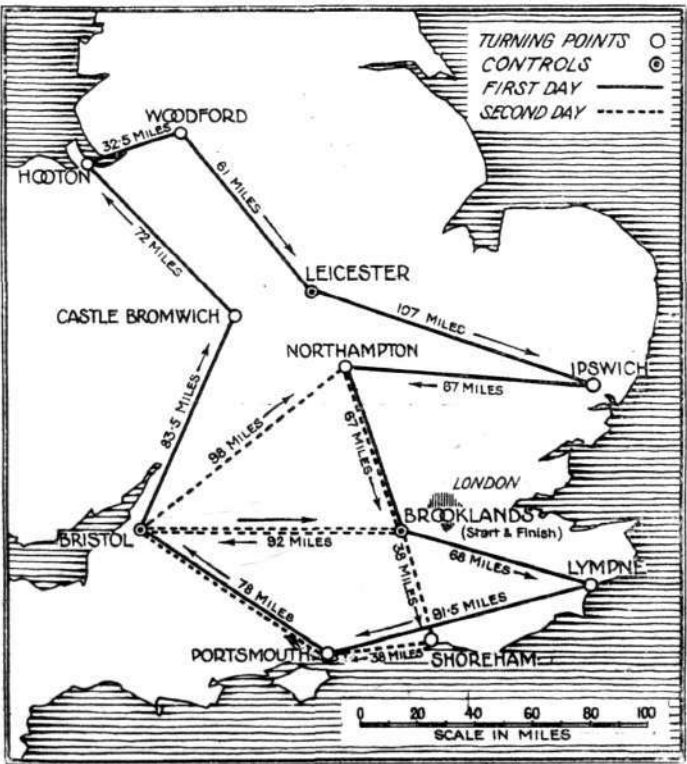
| Friday, July 8, 1932 | | Miles |
|--------------------------------|-------|-------|
| BROOKLANDS (Start) | | |
| Lympne. Turning point | .. .. | 68 |
| Portsmouth. Turning point | .. .. | 91½ |
| BRISTOL. (Control) | .. .. | 78 |
| Castle Bromwich. Turning point | .. .. | 83½ |
| Hooton. Turning point | .. .. | 72 |
| Woodford. Turning point | .. .. | 32½ |
| LEICESTER. (Control) | .. .. | 61 |
| Ipswich. Turning point | .. .. | 107 |
| Northampton. Turning point | .. .. | 87 |
| BROOKLANDS. (Finish) | .. .. | 67 |

Approximately 747½

| Saturday, July 9, 1932 | | Miles |
|----------------------------|-------|-------|
| BROOKLANDS. (Start) | | |
| Bristol. Turning point | .. .. | 92 |
| Northampton. Turning point | .. .. | 98 |
| BROOKLANDS. (Control) | .. .. | 67 |
| Shoreham. Turning point | .. .. | 38 |
| Portsmouth. Turning point | .. .. | 38 |
| Bristol. Turning point | .. .. | 78 |
| BROOKLANDS. (Finish) | .. .. | 92 |

Approximately 503

Aviators’ Certificates.—Thirty-two Aviators’ Certificates, Nos. 10304 to 10335, were granted. (These will be published next week.—ED.)



The Course for the King’s Cup Air Race

Gliding Certificates.—The following Gliding Certificates were granted:—

GLIDING CERTIFICATES FOR THE MONTH OF JANUARY, 1932

“ A ” CERTIFICATES

| No. | Name of Holder | Club | Date |
|-----|------------------------|--------------------------------|------------|
| 250 | William D. Mac-Clement | London Gl.C. | .. 17.1.32 |
| 251 | Allan G. Bright | Imperial College Gl.C. | 7.1.32 |
| 252 | Geoffrey P. Hebden | Ditto | .. 25.9.31 |
| 253 | George J. Lock | Furness Gl.C. | .. 17.1.32 |
| 254 | Edward G. Smitham | Southern Counties Soaring Club | 19.10.31 |

“ B ” CERTIFICATES

| | | | |
|-----|-------------------|------------------------|-------------|
| 143 | John H. Payne | Imperial College Gl.C. | 20.9.31 |
| 178 | Felix M. Hamilton | London Gl.C. | .. 6.9.31 |
| 58 | Frederic Pilling | Furness Gl.C. | .. 27.12.31 |

“ C ” CERTIFICATE

| | | | |
|----|-----------------|--------------|------------|
| 16 | Percy Michelson | London Gl.C. | .. 17.1.32 |
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British Gliding Association.—Maj. H. A. Petre, D.S.O., M.C., was nominated to represent the Royal Aero Club on the Council of the British Gliding Association for the year 1932.

Britannia Trophy.—The Britannia Trophy for the year 1931 was unanimously awarded to Sq. Ldr. H. J. L. Hinkler, A.F.C., D.S.M., for his flight from New York to London, which, in the opinion of the Committee, was the most meritorious performance in the air accomplished during the year 1931.

General Council of Associated Light Aeroplane Clubs.—The report of the meeting of the General Council of Associated Light Aeroplane Clubs, held on January 26, 1932, was unanimously adopted.

Carnets de Passages en Douanes.—It was reported that the Egyptian Government had agreed to the admission of British aircraft into Egypt under the carnet system, and the exchange of guarantees between the Royal Aero Club and the Aero Club of Egypt was unanimously approved.

Royal Aero Club Parliamentary Committee.—The Royal Aero Club Parliamentary Committee was appointed as follows:—

Capt. H. H. Balfour, M.P., W. Lindsay Everard, M.P., Lt. Col. A. Hamilton Gault, D.S.O., M.P., Lord Gorell, C.B.E., M.C., Capt. H. S. Broad, Maj. A. Goodfellow, Maj. H. A. Petre, D.S.O., M.C.

Royal Aero Club Committee.—Lord Gorell has been elected to the Committee of the Royal Aero Club to fill the vacancy caused by the retirement of Air Vice-Marshal C. A. H. Longcroft.

ANNUAL GENERAL MEETING

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held at 119, Piccadilly, London, W.1, on Wednesday, March 30, 1932, at 8.30 p.m.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than twenty-one days before the meeting, and must be signed by at least five Members.

Election of Committee.—In accordance with the rules the Club shall be governed by a Committee of 18 Members. Members shall be elected to serve for two years, half the Committee retiring annually.

The retiring Members of the Committee are:—Capt. H. S. Broad, Maj. C. J. W. Darwin, D.S.O., W. Lindsay Everard, M.P., Maj. A. Goodfellow, Col. F. Lindsay Lloyd, C.M.G., C.B.E., J. Lord, Lt. Col. J. T. C. Moore-Brabazon, M.C., M.P., Lt. Col. M. O’Gorman, C.B., Maj. H. A. Petre, D.S.O., M.C.

Retiring Members shall be eligible for re-election.

Nominations of Candidates.—Nominations of candidates for election to the Committee must be received by the Secretary not less than fourteen days before the Annual General Meeting, with an intimation in writing that the Members nominated are willing to serve. Nominations of candidates shall be signed by at least two Members proposing them.

Offices: THE ROYAL AERO CLUB,
119, PICCADILLY, LONDON, W.1.
H. E. PERRIN, Secretary.

Private Flying & Club News

THE HERTS AND ESSEX AERO CLUB DINNER

The Herts and Essex Aero Club is one of the youngest but by no means least important of our Light Aeroplane Clubs. It is unique in that it was started and is run by a number of enthusiasts who had no past R.A.F. flying traditions to work upon, all being entirely new to the game. The brothers Roger and "Buster" Frogley, so well known on the dirt track, found that operating their own machine was to a certain extent an unsatisfactory business if the aerodrome and even the machine itself could not be shared with others, and they therefore decided to form a club. In this they were aided and abetted in a very generous manner by their father, who is landlord of the aerodrome and who materially assisted in putting up the club-house.

Since its inception the Club has grown very rapidly, and now has a name for being extremely "flat out," and anyone who pays them a visit is assured of a most hearty welcome. On Thursday, February 11, they held their first dinner and dance at the Holborn Restaurant, Kingsway. The menu was extremely cleverly compiled, and, notwithstanding the fact that the names of many of the dishes have local significance, we think that readers will find them very amusing.

The Secretary of the Royal Aero Club, Mr. H. E. PERRIN, proposed the toast of "Civil Aviation." He said that he was a substitute, and he regretted sincerely the fact that Col. Shelmerdine, the Director of Civil Aviation, who was to have proposed the toast, was laid up with 'flu. Mr. Perrin said that the light aeroplane

Col. THE MASTER OF SEMPILL, in replying to the toast, eulogised the brothers Frogley for the magnificent work they had done for the club. He said that the question of subsidy was one of burning interest at the moment, and the reports they had received recently of the meetings of the Associated General Council of Light Aeroplane Clubs made them hopeful for the future. Interest in flying must, he said, be kept alive, and it was the duty of every club member to foster this interest and do all they could to bring other people into it. He then said that he would propose that those present should proceed with the dancing without further ado.

At this point the assembly was entertained by Mr. Morris Charles and Mr. Leonard Henry. The former sketched with lightning rapidity in charcoal on a large board while singing the chorus of several popular songs. The latter is well known as one of the outstanding comedians of the B.B.C. programmes, and his sallies made everyone present ache with laughter.

Following him, FLT. LT. TOMMY ROSE proposed the health of the club. He said this was an age of miracles, and if anyone had suggested two years ago that two people entirely new to flying, such as the brothers Frogley, could have established such a successful club as this one, he would not have believed them. The miracle had, however, come about, and he himself was one of the founder members. He deprecated an idea prevalent amongst certain people that the chief profits of a club were to be obtained from the bar. This was entirely the wrong idea, he said, for it was from the flying side that every club should endeavour to make its money. He drew attention to the fact that in no small measure the success of the club was due to the help received from Capt. Duncan Davis and his assistants from the Brooklands School of Flying.

MR. F. E. DARLOW, the Secretary of the club, replied and voiced a plea for a short period of seriousness. He then proceeded to offer a few statistics illustrating the exceptional growth and success of the club, in the short time it had been in existence. They started flying last Easter, he said, and although their path had been hard, yet they had instituted a large number of improvements, and all members now were very happy. He announced that blind flying would shortly be one of the forms of instruction available, and that a committee was being formed to take greater care of the social side of the club. He also visualised an increase in the number of their aircraft and the engagement of a second instructor at a fairly early date. He spoke in glowing terms of F/O. W. R. Bannister, on whom, he said, rested the smooth running of the entire flying side and to whom they were greatly indebted for the instruction he had given them.

Mr. Darlow then referred in equally glowing terms, firstly to their ground engineer and then to large number of others who were responsible for most of what had attributed to the success of the club. When he came to the Frogley family, the enthusiasm of the guests became unbounded. Mr. Darlow went right down from the oldest, in the person of Mrs. Frogley, who, although over 70, has flown and wishes to do so again, down through Mr. Frogley, Senr., and the brothers Frogley, together with their

MENU (Herts and Essex Aero Club.)

Hors-d'Aviation

Consommé aux Ailerons
Crème de Tomate Broxbourne

Filet de Sole Cirrus

Côte de Pré-Salé Bann
Pommes Noisettes Nazeing

Mandarine Stark—Sens dessus dessous

Poulet Frogley
Salade de Soutter
Pommes frites V.K. et W.T.

Altimeter Froid
Pain au Miel Pilot

Cafe-Hettie

clubs were responsible for a very great deal in civil aviation, and to illustrate this fact he pointed out that of the 2,000 "A" licences which had been issued, some 1,300 were held by club members, while 200 of this number were held by ladies. Mr. Perrin said that they welcomed a representative of the Herts and Essex Club to the Associated General Council of Light Aeroplane Clubs. Over 80 per cent. of the aerial touring of the world was also, he said, done by members of the British light aeroplane clubs. After many similar examples illustrating the power which light aeroplane club members have become, not only in this country but the whole of the world, he asked those present to drink to the "health" of "Civil Aviation," coupled with the name of the Master of Sempill, whom, he said, in his opinion, had done more than anybody else to stimulate interest in flying in this country.



FOR REPAIR AND MAINTENANCE: The photograph on the left shows the fuselage repair shop at the Phillips and Powis School, Reading, and that on the right their engine overhaul section.



DESIGNED FOR COMFORT: The inside of the Reading Aero Club. The attractive furnishing is largely the result of the active feminine interest provided by Mrs. Powis and many other lady members.

wives. He regretted, he said, that Mr. Roger Frogley was away in New Zealand gaining fresh laurels as a dirt-track rider, and he suggested that they should send a cable to him to mark the occasion. This suggestion was, of course, received with acclamation.

No report of the occasion can be made without mention of Mr. Tom E. Davis, who acted as toastmaster throughout. His genial efficiency overcame any backwardness people may have felt in making themselves known to each other, and from first to last one might truthfully say that he was the life and soul of the party.

After dinner there was a short interval, during which time the room was cleared, and before the dance started there was an excellent cabaret show by the Palace Speedway Girls.

THE READING AERO CLUB

Saturday, February 13, was very cheerful, not to say exuberant at times, for some 80 members of the Reading Aero Club. The occasion was one of the periodical dances arranged by this club and was, as are all functions at Reading, a thoroughly enjoyable one. The whole of the centre portion of the large clubhouse, which incidentally was designed and built by the En-Tout-Cas Co., of Syston, Leicester, has a most excellent dance floor, and, when the folding doors to the dining room are open, forms a very attractive ballroom. At the present moment there are quite a large number of people actually living in the clubhouse, and from personal experience we can assure readers that the bedrooms and other facilities provided are excellent. Anyone who wishes to stay there over the week-end while putting in some flying time will be made thoroughly comfortable.

The Club itself, which now has a membership of over 300, is actually run in conjunction with the Phillips & Powis School of Flying. It does not operate its own machines, and therefore does not claim the Government subsidy, although it is eligible for this. It chiefly looks after the social side of the aerodrome activities, and when any of its members wish to fly solo, the club hires machines from the School. This School is undoubtedly one of the successful ones in the country, and last year their number of flying hours was 2,194 hr. 30 min., while 41 men and three women gained their "A" licences. Quite a large number of foreigners have come to this delightful country aerodrome to learn to fly, including an Afghan, a Dane, three Egyptians, two Indians and one Chinese, as well as a Greek who is at present under instruction.

Naturally, such an establishment as this also caters for the overhaul and repair, both of engines and aircraft. A tour of inspection of the shops immediately impresses one with the efficient manner in which everything is run. All manner of repairs can be undertaken, even to the complete re-covering and doping of wings, for which, of course, a special shop is set aside.

As an example of the type of pupil turned out by the

School, we should like to quote Mr. H. W. Sears, who learned to fly at the School two years ago when home on holiday from Nairobi. After completing 11 hr. 30 min. solo flying he shipped a "Gipsy Moth" out to Kenya, where he did some 300 hr. more flying without the slightest trouble from aircraft or engine. He has now flown back to Reading in a total flying time of 82 hr. and his summing up gives some idea of the physical and administrative conditions to be met with on such a trip. The physical conditions will, we trust, largely be negated by better and more suitable aircraft for a trip like this, such as, for example, the "Puss Moth" or the new "Monospar," the first production model of which should be flying early next month. The administrative trouble can only be overcome by strong action, chiefly of a diplomatic nature. Mr. Sears, after describing his route to us, said that he was alternatively roasted, frozen, snow

bound, fog bound, mud bound, messed about, tossed about, humbugged, and robbed, but otherwise it was a very pleasant trip! He also paid particular tribute to the rather wonderful fuel organisation of the Shell Co., and he says that at no time did he have the slightest trouble in procuring the fuel he required. Others who rendered him signal assistance at various places were the R.A.F. and the Italian Royal Air Force. Ironically enough, Mr. Sears found the most difficult part of the whole trip, from the point of view of weather, was from Redhill to Croydon.

One of the chief aims of the flying instructor at a school like this is to avoid their pupils developing any habits which may in emergency lead them into danger, for any sort of danger at all is the kind of thing which must at all costs be avoided, particularly at a club and school like that at Reading. On Sunday morning we were the very happy witnesses of an occasion which showed to the full that the instruction the pupils receive there is undoubtedly of the highest quality. A private owner, whom we have not the pleasure of knowing personally, had just taken off, and when about three quarters of the way across the aerodrome his engine cut out. We at once offered up a small prayer that he would not attempt to turn back, but we need not have worried, for, due to his good training, he held faithfully on, dead into wind, and brought off an excellent safe landing in a harrowed field beyond the aerodrome boundary. The dangers of turning back have in the past been all too forcibly impressed upon people, as several of our finest pilots have been killed by so doing, but even now it is not unknown for a comparatively inexperienced pupil to feel that he has room to do so, and it was therefore very gratifying to all of us who have the welfare of aviation at heart to see that this danger is one of those avoided at Reading.

BROOKLANDS NOTES

The flying hours of the School amounted only to 25 during the last week, fog again holding up the flying considerably during that period.

A new pupil to join the ranks at Brooklands is Mr. Stewart Vetch.

Members of the staff of the School were invited to the dinner and dance given by the Herts and Essex Aero Club at the Holborn Restaurant on the evening of the 11th. Those who attended thoroughly enjoyed themselves, in fact, judging by their remarks, the Herts and Essex Club have nothing to learn in the manner of staging a very cheery and delightful evening.

Mr. Lucas, a test pilot of the Hawker Engineering Co., is welcomed back to Brooklands, having just returned from a tour in the Far East.

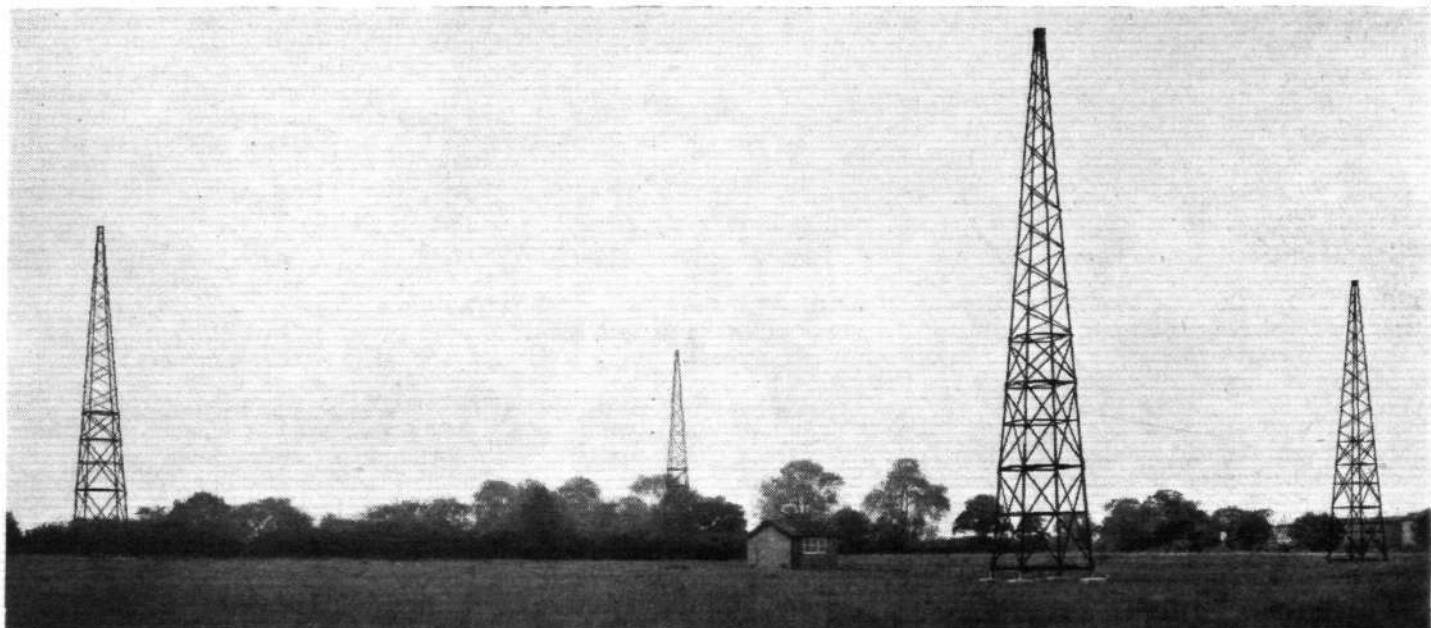
THE PRESS AT BROOKLANDS

The Press Aero Club will be meeting for the first time on Sunday afternoon at Brooklands, when it is hoped that all members will arrive in force.

Air Transport

Wireless and Night Flying

The Marconi-Adcock Direction Finder



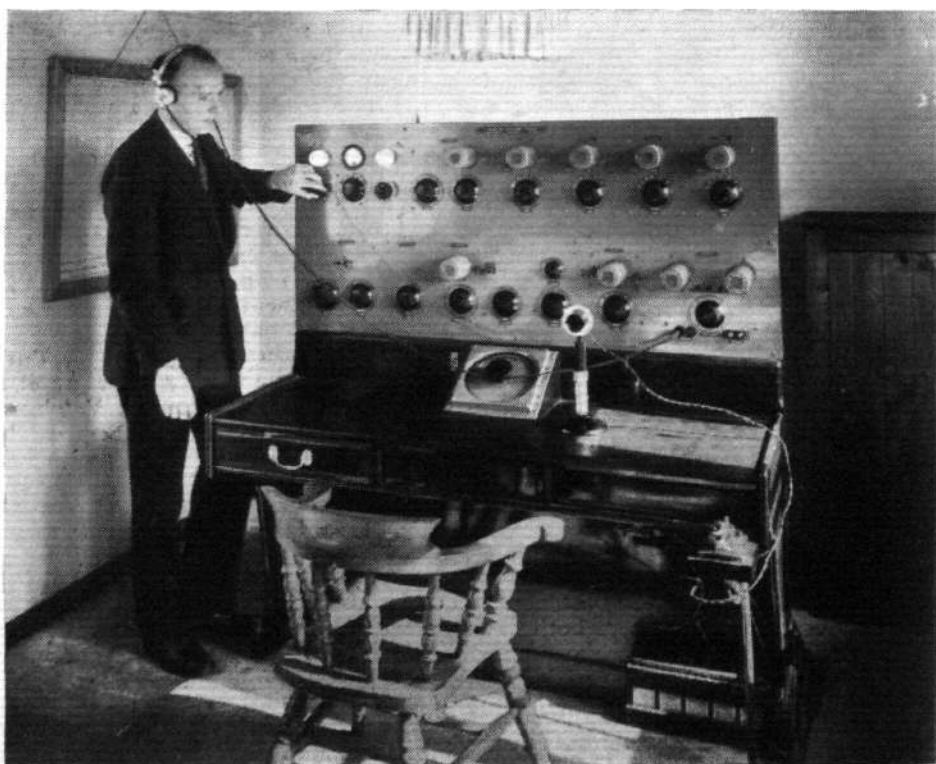
Photograph showing the building containing the Marconi-Adcock "anti-night-effect" Direction Finder at the Pulham Direction Finding Station, Norfolk, with four 70-ft. wooden towers inside which are suspended four vertical aerials which are connected to the Direction Finder by means of copper feeders carried on supports above the ground. The towers stand at the corners of a square 300 ft. diagonally across.

WIRELESS direction finding, which enables pilots to be informed of their position in the air during foggy or cloudy weather, is one of the most valuable services of wireless to aviation. By its aid, a number of flights have been made between London and the Continent during which the pilots have scarcely been able to see the ground throughout the

journey, but, reliable as it has proved under these conditions, wireless direction finding has hitherto been subject to one limitation. It was subject to errors during the hours of darkness, and particularly at sunset and sunrise, due to the natural phenomenon of the irregular polarisation of wireless waves at these times.

Realising the importance of providing a direction finder

Marconi-Adcock "anti-night-effect" Direction Finder installed at the Pulham Direction Finding Station, Norfolk. The wave range of this Direction Finder is from 800-1,800 metres, and the special feature of this instrument is the elimination of the phenomenon known as "night-effect," which tends to spoil completely bearings taken by wireless before and after sunset and during the hours of darkness. The "anti-night-effect" Direction Finder works in conjunction with four vertical aerials which, at Pulham, are suspended inside 70-ft. wooden towers placed at the corners of a square 300 ft. diagonally across, with the Direction Finding instrument in the centre of the square. Pulham gives bearings to aircraft in flight in conjunction with Croydon and Lympne, and the bearings obtained at Pulham are passed by wireless telephone to Croydon, which has control of the direction finding. The microphone for communication with Croydon is on the table on the right of the Direction Finder. A Morse key is also provided for working telegraphy if desired.



capable of giving accurate bearings at all times of the day and night, particularly in view of the probable extension of night-flying services in the near future, the Marconi Company has now developed a direction finder to overcome this "night effect."

Exhaustive tests have demonstrated that the apparatus is as reliable during the most critical periods of "night effect" as is the well-known Bellini-Tosi apparatus under normal conditions.

The first station of this type to be erected has been built by the Marconi Company for the Air Ministry direction-finding station at Pulham, Norfolk, which, in conjunction with the wireless direction-finding station at the London Air Port, Croydon, operates the direction and position-finding service for aircraft on the London-Continental air routes.

Night Flight Tests

During a night flight specially arranged by the Air Ministry, fourteen observations were made by an aircraft transmitting signals from known positions, so that a check could be kept. The distance in every case was in the neighbourhood of 100 miles, and the accuracy of the new direction finder was complete. The ordinary system of wireless direction finding was, at the time, most unreliable even over much shorter distances owing to "night effect."

The Cape Air Mail Reaches London

As the result of several irritating mishaps and delays (previously recorded in FLIGHT) the first through air mail from the Cape to England arrived at Croydon—on February 16—nine days late. It is, indeed, regrettable that Imperial Airways should experience these misfortunes at the start of the long awaited service—but Fickle Fate is often thus unkind. The first delay occurred at Salisbury where the machine in taking off ran on to some soft ground which had been cleared of an ant hill, the wheels sinking into the ground and damaging the undercarriage. The second delay happened 40 miles south of Broken Hill when the machine ran into a very violent rain storm and landed on what was thought to be dry land, but proved to be a swamp. Here the machine was delayed for several days, missing the northbound connection at Nairobi. It was therefore decided to wait for the next mail, which met with further delays, due to bad weather *en route*, and reached Croydon two days late.

New London-Cannes Air Service

NEARLY 100 years ago Lord Brougham, searching for sunshine for his invalid daughter, installed his household at Cannes. This started the English colony on the Riviera. Whether his Lordship travelled in that peculiar vehicle which also bears his name is not recorded, but if so the delay and discomfort of the journey would have interested him in the news that a daily air service is now flown in seven hours from London. The line opened on February 13. Cannes, with a century of this country's influence behind it, has so much British capital invested in its hotels, shops and amusements that the most ardent supporter of the "Buy British" campaign may be excused a visit on the grounds that he is increasing invisible exports and at the same time enjoying the sun, which so far has refused to be drawn into either politics or economics. Air Union, who are operating the new service, use nearly the whole of their receipts in London for their expenses here—their subsidy from the French Government supplies the balance—so that a good proportion of the journey is paid for by the French taxpayer! The air journey to Cannes starts at Croydon Aerodrome at 9 a.m. by the well-known Golden Ray type of air liner. This machine flies as far as Lyons, where the passengers are transferred to a Rapid Azur aeroplane for the last stage of the journey over the Alps. Cannes aerodrome, which is just against the golf course, is reached at 4.30 p.m. In spite of the fact that the whole journey is made so rapidly, the fares are cheaper than those of the Blue Train and sleeper, which takes 24 hours, especially when advantage can be taken of the special 15-day air return ticket.

A 5-engined Russian Commercial Aeroplane

THAT Soviet Russia is determined not to be left behind in the development of large commercial aircraft has been evident for some time. We have previously described in FLIGHT aircraft of Russian design and construction, and now comes news of yet another civil aircraft of somewhat

Special Features of Design

Many attempts had previously been made to eliminate the effect of the abnormally polarised wireless energy on the horizontal members of the frame aerial system usually employed for direction finding. The Adcock spaced aerial, which eliminated the top horizontal members of the loop aerial and balanced out the effect of the bottom horizontal members, was one of the most successful of these attempts, but the form of its construction rendered it difficult of application for general use. The Marconi Company's new development of the Marconi-Adcock aerial system represents the practical application of these principles, the company's long experience in the problems of aerodrome wireless equipment facilitating the production of a simplified aerial which still retains every essential feature for correct day and night direction finding.

Four vertical aeriels are suspended within lattice wood towers erected at the corners of a square, the diagonal of which bears a relation to the wavelength to be employed. A special insulated feeder, completely screened and non-receptive, connects the bottom end of each aerial with the receiver and radiogoniometer, which are at the centre of the square.

The Marconi-Adcock station at Pulham has a wave range of 800-1,800 metres; the system has also been developed for use over an extensive wave band, and has been applied to the reception of short waves.

ambitious dimensions and power. The new machine is, like several types that have preceded it, the conception of the Russian engineer Alexander Nicholas Tupoliev, of the Central Aero-Hydrodynamic Institute of Moscow, and is known as the A.N.T. 14. It is an all-metal cantilever monoplane, with five "Jupiter" engines, four of which are supported in faired nacelles projecting forward from the leading edge of the wing, two abreast on each side, while the fifth engine is placed in the nose of the fuselage. The machine, which has a wing span of 132 ft. 7 in. and a wing area of 2,585 sq. ft., is reported to have a useful load of 7 metric tons (15,400 lb.). This figure probably represents the total disposable load. No figures of tare and gross weight are available at the moment. The A.N.T. 14 is designed to carry 34 passengers in great comfort, and is reported to have a cruising speed of about 110 m.p.h., with a maximum speed of 133 m.p.h. The "Jupiter" engines give a total power of 2,400 b.h.p.

French Air Lines to North Africa

M. COUCHÉ, French Inspector-General of Civil Aviation, is now in Algeria inquiring into the possibility of a daily air passenger service between Algiers and Marseilles.

The Air Mail Service to the Orkneys

THE Postmaster-General has sanctioned the carrying of mail at an extra fee of 3d. per letter between the Orkneys and Pentland Firth by the North British Aviation Co., of Hooton Park Aerodrome, Cheshire. It is hoped to start the service in May next.

Proposed Atlantic Air Mail

ACCORDING to the Reykjavik Reuter Correspondent a new Atlantic Air Mail service is to be launched by the Trans-American Airlines Corporation, which has applied to the Government of Iceland for permission to establish there one of the main bases of the new service. A modern airport, complete with hangars, wharves, depôts, storage tanks, and a radio station, is to be constructed for the exclusive use of the daily mail service, which is to remain in operation both winter and summer. It is expected that the journey from Detroit to London will occupy 48 hours, or 72 hours if the service does not operate by night.

Postal Charges on the African Airway

THE Postmaster General, in the course of a reply to a question in the House on February 8, which compared the charges for letters to South America by the Aeropostale with those to South Africa by Imperial Airways, said: "I would point out that the charges for transport on this service (*i.e.*, Aeropostale) are nearly 10 times greater than the charges on the Indian air service and five times the charges on the South African air service. I would point out to my hon. Friend that any decrease in the gross weight of the mails resulting from a reduction of the present half-ounce minimum for air letters might well lead to an increase in the rates charged for the conveyance of the mail. In that case it would be necessary to raise the air fee."

Airisms from the Four Winds

An Ambitious Record Attempt

MESSRS. L. HAMILTON and R. K. Coupland should, if the weather has been propitious, have left from Lympe by the time this is in print on an attempt to fly, in record time, from England to Australia and straight back again. Their programme is to fly day and night, with stops of only two hours at the following places:—Marseilles, Rome,* Athens, Aleppo, Basra,* Bunder Abbas, Karachi,* Jhansi, Calcutta, Rangoon, Victoria Point, Singapore,* Batavia, Bima, Koepang,* Port Darwin. Those places marked with an asterisk are scheduled as night landing points. As a general rule, the take-off will be timed so that the subsequent landing will be either in the evening or early the next morning. The "Puss-Moth" which they are flying has an extra 20-gall. tank behind the passenger's seat from which fuel is fed to the service tank by a hand pump, and both wing tanks are of 17½-gall. capacity, giving them a range of 9½ hr. As their longest hop will be about 8 hr., they should have a reasonable margin of supply. The two pilots will fly alternatively, each taking entire charge during his "watch." The machine is fitted with navigation lights and should not, therefore, experience any difficulty, providing the weather is fair, in flying the night stages; it is the same machine, G-AAXW, which when it was first fitted its Arens controls, was flown in record time by Capt. C. D. Barnard to Malta and back.

Missing R.A.F. 'Plane Found

THE last of the three R.A.F. aeroplanes which, as reported last week, were missing in the Syrian Desert was found on February 10 by the French Air Force 15 miles north of Imtan, in Syria, where the other 'planes had previously been located.

French Survey Flight over Africa

ON February 16 the French airman M. Dieudonné Costes and two companions left Villacoublay in a Bréguet 27 biplane (650-h.p. Hispano-Suiza engine) for a survey flight over Africa during which they expect to cover about 9,000 miles.

R.A.F. East African Flight

THE Air Ministry announces that the R.A.F. East African flight arrived at Moshi, Kilimanjaro, on February 14 from Mombasa.

Soviet Airmen Arrested

Two Russian airmen who entered India without passports by crossing the Khyber Pass on foot were sentenced on February 12 by the city magistrate to three months' simple imprisonment.

R.A.F. Aden to Cairo Flight

No. 8 (Bomber) Squadron, R.A.F., which is stationed at Aden, sent four Fairey III.F machines last week on a flight from Aden to Cairo. The flight, which was led by Sqd. Ldr. R. S. Sorley, D.S.C., D.F.C., was part of the programme for practising communication between various R.A.F. stations overseas. The route was via Perim, Mas-sowah, Port Sudan and Suez. The return journey will be made via Luxor, Aswan, Atbara, Khartoum and Port Sudan. Flt. Lt. F. W. Long, late of the High-Speed Flight, is joining No. 8 (Bomber) Squadron, as previously announced in FLIGHT.

Steam-Powered Aircraft

It is reported that tests are shortly to be undertaken in Chicago with a new aeroplane equipped with a steam-driven power plant. According to the inventor, Mr. H. Crossland Plaff, this steam-driven plane will be able to remain in the air for over

30 days without refuelling! It will be equipped with a light-weight engine operating on crude oil, developing one horse-power for each pound of its weight—a ratio hitherto unattained in other aero engines. It is stated that ground tests have proved satisfactory, and flying tests will shortly be undertaken.

Kingsford Smith and China

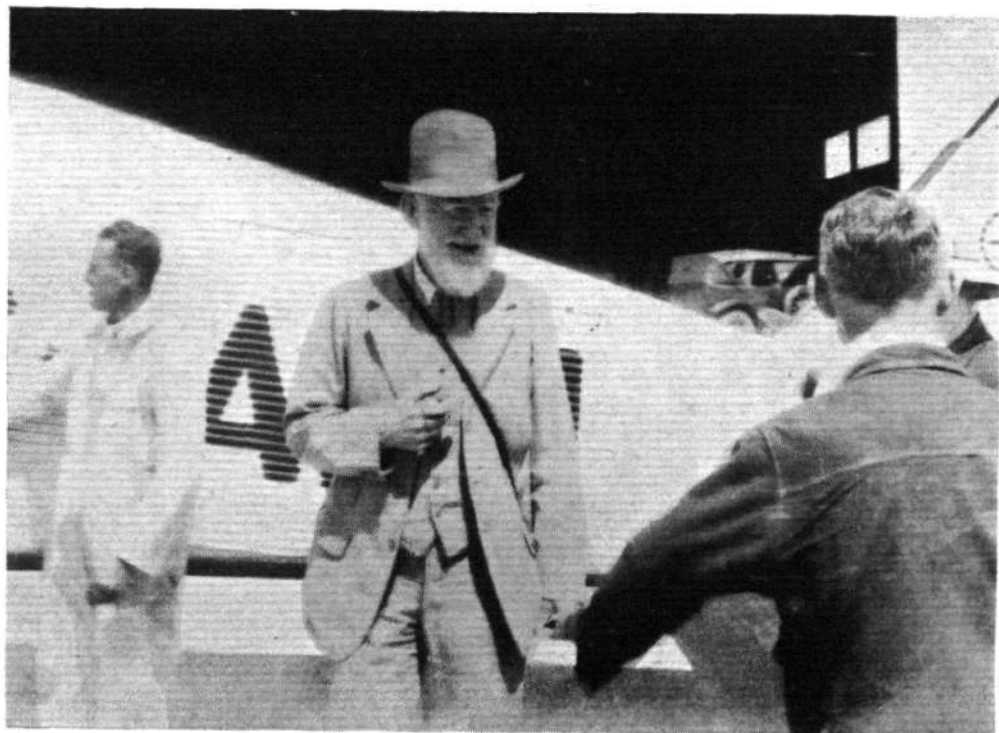
THE Sydney correspondent of the *Daily Herald* reports that Hon. Air Commodore Kingsford Smith has been offered the post of Commander-in-Chief of the Chinese air forces. He is stated to have quoted figures to Chinese officials for the sale to China of the Avro 10 machines belonging to Australian National Airways. It is also stated that some out-of-work Australian pilots are considering forming a squadron to fight for China, and that a wealthy Chinese resident in Australia has offered to finance it. Presumably all these pilots are on the Reserve of the Royal Australian Air Force, and, although China and Japan are not formally at war, they could not offer their services to a foreign Power without the express permission of the Australian Government. It has been asserted and also denied that the present chief of the Chinese Flying Corps is Bert Hall, late of the Escadrille Lafayette. Hall certainly held a command in the Chinese Flying Corps some time ago, and is probably taking an active part in the present operations.

The Sino-Japanese Fighting

THE Japanese have made extensive use of aircraft, mostly ship-planes from their carrier it appears, to bomb the town of Chapei and the Chinese forts at Woo-Sung. Chinese aircraft have also appeared in the sky, and it was reported that on February 4 one Japanese machine was shot down from the ground and another was brought down in aerial combat by a Chinese airman. It is recalled that in 1920 the Chinese Government ordered a number of Vickers "Vimy" bombers, which have never been taken out of their cases, and speculations have been made as to whether these have now been assembled and flown.

Egyptian Crown Prince at R.A.F. Display

PRINCE FAROUK, the Egyptian Crown Prince, who has just celebrated his thirteenth birthday, officially represented the King for the first time when he attended the R.A.F. display at Heliopolis on February 12.



G.B.S. FLIES: As reported in "Flight" the other week, Mr. George Bernard Shaw made his first flight on Jan. 23, when he, and Mrs. Shaw, flew over Cape Town in a Junkers machine chartered from S.W. African Airways by Union Airways. Our photograph, which was received last Tuesday per first through Cape-England Air Mail, shows "G.B.S." ready to enter the machine.

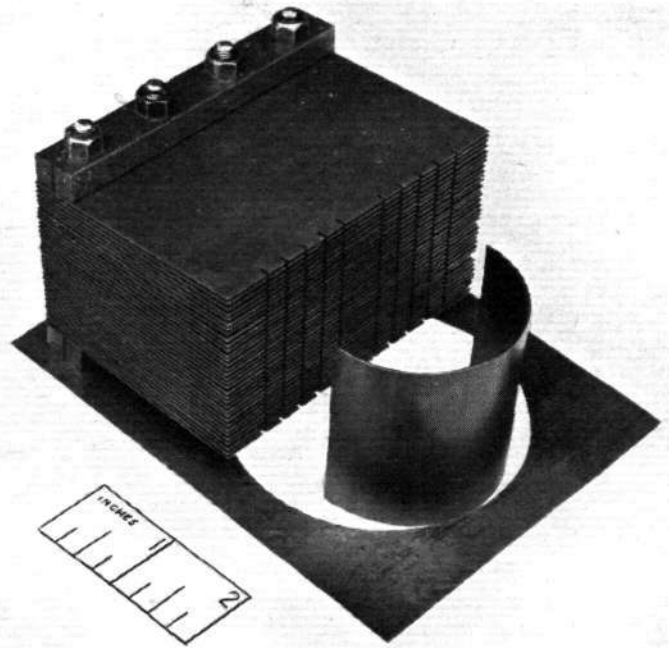
Testing Structural Components

UNDER the title "Mechanical Tests of Aircraft Structural Components" Mr. I. J. Gerard, M.Sc., Assoc.M.Inst.C.E., A.F.R.Ae.S., read a paper before the Royal Aeronautical Society on February 11.

Major Barlow, Chief Engineer of the Fairey Aviation Co., Ltd., took the chair in the absence of Mr. C. R. Fairey, who is recovering from an attack of influenza. In introducing the lecturer Major Barlow said that he was particularly fitted to give that lecture, as he had been trained in Yorkshire and had been doing test work at the Royal Aircraft Establishment, Farnborough, since 1914. The lecturer had designed original testing machines, and Major Barlow regarded the test work which the lecturer was doing as being particularly important, because it was the link between theory and practice.

We have not the space to give Mr. Gerard's lecture in full, but must confine ourselves to the portions of it which dealt with what are, perhaps, the less known aspects of testing aircraft structural components. After pointing out that in tests of spars made of thin high tensile corrugated strip, local wrinkling almost invariably follows general bowing at an early stage, and that the strength of spars of this class was therefore largely dependent on the maximum compression stress which might be developed in the wall before collapse took place by wrinkling, the lecturer said that it had been found that this stress was dependent on the depth of corrugations relative to the thickness of the strip. Every element of whatsoever shape had its equivalent expressed as a given length of the arc of a circle of given radius and wall thickness. If, for any given material, the relationship between wrinkling stress and the ratio of thickness over radius was known, the ultimate strength could be calculated with a degree of accuracy approaching that for the strength of a solid beam. However, the hollow spar differed from the solid beam in that increase of apparent stress might cause a fairly large variation of E.I.

In order to provide these important data a special form of strip compression test had been devised, which reproduced in a small test piece the necessary conditions of loading. This special test jig is shown in one of the illustrations. A two-inch length of strip is bent into the arc of a circle of 180 degrees, with two flat tangential tensions at the straight edges. These extensions are engaged in a jig, as shown in the illustration. The end faces are flat and parallel, and the test piece is loaded in a compression jig.

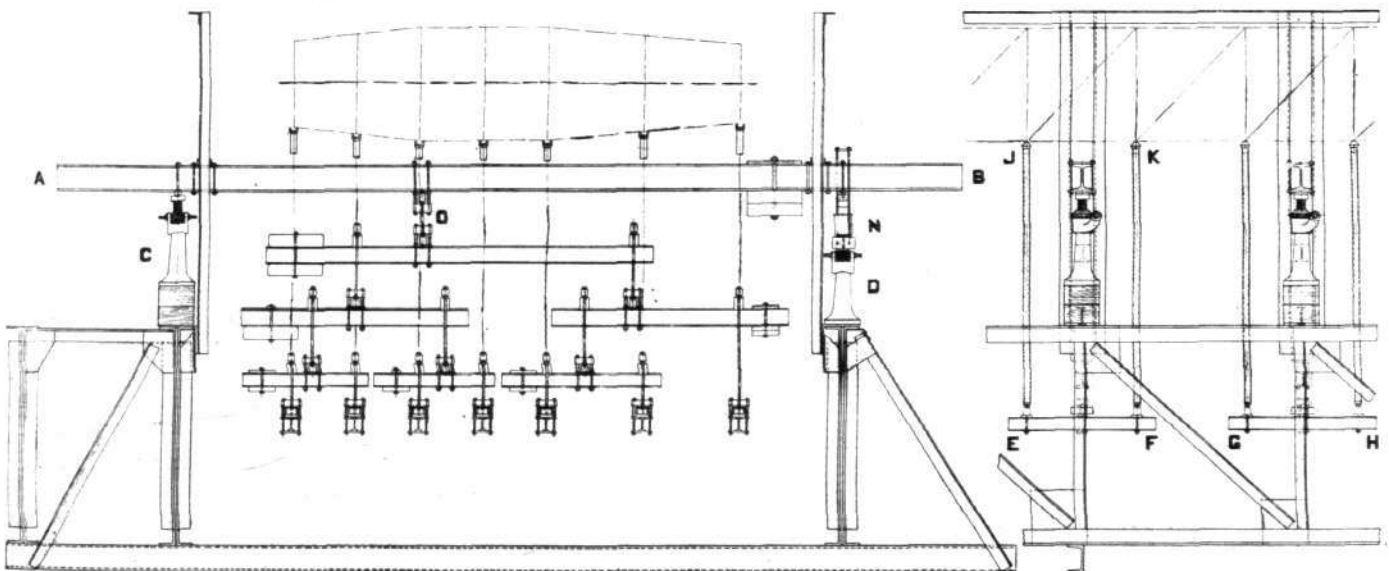


COMPRESSION TEST OF STRIP: The free edges of the test piece are located in the saw cuts in the plates of the jig and are thereby prevented from buckling, although no restraint to axial shortening is presented. The test piece and edge-restraint jig are loaded in a compression jig.

(R.A.F. Official, Crown Copyright.)

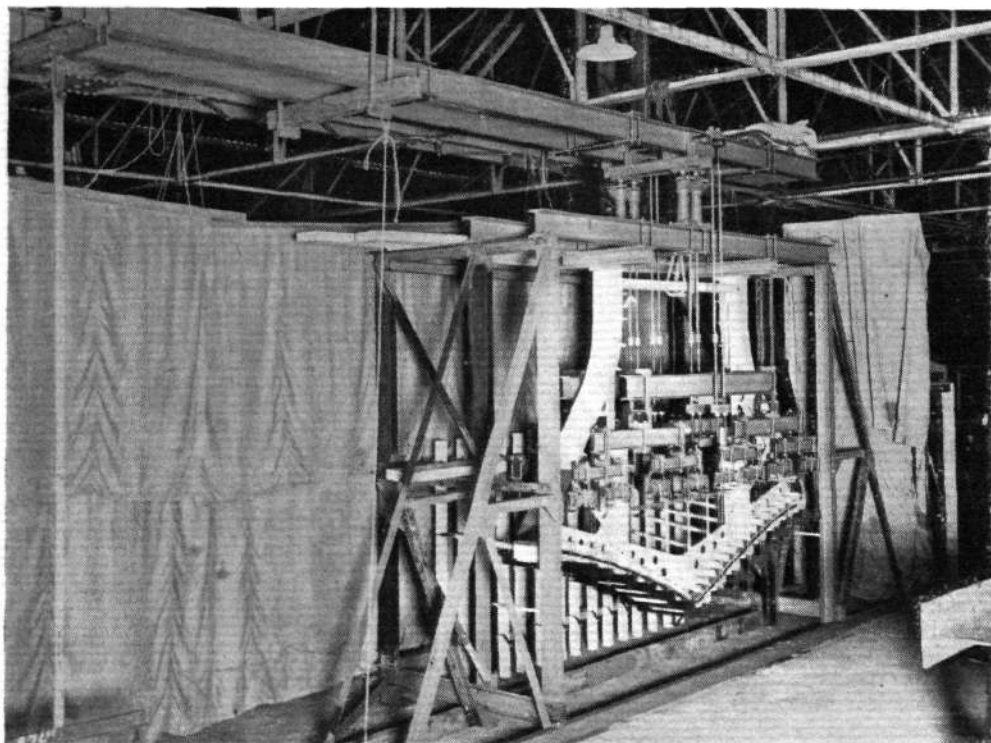
New Methods of Strength Testing

An interesting machine for strength-testing a multi-spar cantilever wing was described by the lecturer. This machine was, we believe, first used for testing an all-metal wing designed by the Bristol Aeroplane Co., Ltd. This wing had flat metal covering and multiple spars, and the arrangement of the testing machine is shown diagrammatically in an illustration. Under each rib is placed a horizontal beam A-B, capable of being raised on two screw jacks, C and D. From the beam, the lecturer said, is suspended a series of levers giving the correct chordal



DIAGRAMMATIC REPRESENTATION OF WING TESTING MACHINE: A horizontal beam is raised on two screw jacks, and the load is applied to numerous points on the wing by horizontal levers and vertical struts.

(R.A.F. Official, Crown Copyright.)



TESTING A FLYING BOAT FRAME: The principle of this testing machine is generally similar to that of the wing-testing machine. (R.A.F. Official, Crown Copyright.)

Points from the Discussion

Major Barlow, in asking Mr. Langley to open the discussion, said that he thought the lecturer deserved much credit for his research work. He personally would like some more information about fatigue stresses.

Mr. M. Langley wished to know something more about the corrosion problem and which metals gave most trouble. Also what was the effect in a spar of many corrugations of small and large radii coming together.

Major Wylie referred to the use of eccentric end loading for imitating exactly the actual conditions of load in a wing spar. By supplying the end load with considerable eccentricity (8-9 inches) a bending movement was produced.

Mr. Hollis Williams referred to the two different methods in force in this country and on the Continent. Here we used calculations based upon theory, and backed them by mechanical tests of components, etc. On the Continent they used mechanical tests only. One result was that "on paper" the I.C.A.N. load factors appeared twice as high as ours.

Mr. W. O. Manning thought that if the variation in I (moment of inertia) of a spar section was large enough to cause any appreciable difference, then it ought to be large enough to be measured during flight.

Dr. G. Lachmann was interested in the small curved test pieces, and thought possibly the same principle could be applied on a larger scale, for example to parts of monocoque fuselages. He would like more information about complete wings. In Germany the DVL had done a good deal of work on this subject, and they had found that the stress developed was less than that of small parts of the materials themselves.

Mr. H. J. Pollard thought that in making mechanical tests the loads were applied too slowly, and that conditions more representative of actual ones would be attained by a more rapid application of the loads.

distribution of load, and these levers are connected to the wing by means of short horizontal beams E-F and G-H, parallel to the spars, and by vertical struts E-J, F-K, etc. Between each of the transverse beams and their respective jacks near the trailing edge a hydraulic ram N is inserted. These rams are all fed from a common source, and for the loading case representing a CP co-efficient of 0.25 all rams are of equal diameter, and therefore carry equal loads.

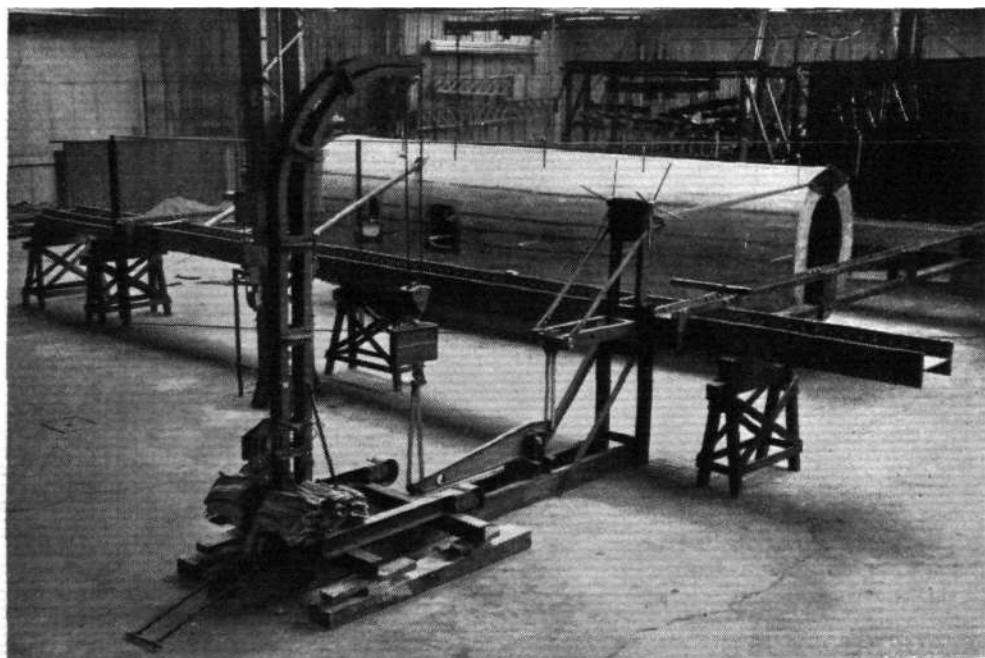
In carrying out a wing test, the loading gear was first balanced by means of suitable bob weights on the various levers and beams, and by the application of a suitable initial hydraulic pressure under the rams. Increments of load were applied by increasing the hydraulic pressure on the rams. Vertical scales, fixed relative to the wing, were attached at 18 different points, and vertical movement of the scales was read by using a Dumpy level mounted some distance away from the wing. In the early tests the load could be applied at the rate of 20,000 lb. per hour, in five increments. This rate was subsequently doubled.

The advantages of this method of strength testing were summed up by the lecturer as follows: The loads applied are always under complete control. Application and release of loads are safe. Any appreciable yield results in automatic and instantaneous reduction of the load. Total collapse of structure is impossible. The structure being tested may be safely and easily observed throughout the tests. The economy in time spent in testing, and the convenience of being able to release the load quickly so as to observe how much distortion is permanent more than counterbalance the apparently high initial cost of providing the test apparatus.

Mr. Gerard concluded by explaining testing machines based on a similar principle, but intended for testing flying boat hull frames and monocoque fuselages. These are shown in illustrations.

TESTING PORTION OF MONOCOQUE FUSELAGE: This testing machine induces combined shear, bending and torsion stresses.

(R. A. F. Official, Crown Copyright.)



The Industry

BUILDING GLIDERS

B RITISH AIRCRAFT CO., LTD., at Maidstone, is one of the few companies successfully facing the reaction which came inevitably after the little boom of last year. There are, for example, 24 clubs using B.A.C. equipment.

Auto-Towing

Mr. Lowe-Wylde (designer and manager of B.A.C.) can really be called the pioneer of auto-towing in this country, and it is due to his initiative that this method of launching has been developed so rapidly. Both he and the indefatigable Mrs. Green, with her "Bentley," visited over 52 different fields last year and gave over 1,300 people joyrides in their two-seater B.A.C. 7, a particularly sturdy job which will stand an unlimited amount of hard use. For example, in the hands of Mr. Lowe-Wylde, one B.A.C. 7 has done 23 hours' flying, and when it is realised how short the average glider flight is it will be seen that the number of flights this machine has made is really stupendous. It is also a reasonably efficient sailplane and has been soared for 1 hr. 37 min. Aeroplane towing is another of its uses, and several long flights were made with it in this manner during last year. Constructionally, it is a glued-up job from start to finish. This makes it particularly strong while remaining light, and obviates any chance of the smaller members such as ribs and struts splitting when being nailed or screwed. One might be inclined to fear that the ply panels would pull away from the longerons in the event of a crash, but this is not the case, and we have seen a fuselage with the fore part of it pretty severely damaged where,

although the ply panels were broken up completely, there was practically no evidence of the glued joints having parted. With such a method a far better joint can be made where the ply has to be laid on a curved surface, for here, as in most other places, the glued joint is held down by means of thin strips of ply which are very lightly tacked down over it until such time as the glue is hard, after which these strips are pulled off and the joints smoothed down. Mr. Lowe-Wylde has not, in his works at Maidstone, made any attempt to produce super-efficient machines, and has contented himself with one good wing which can be attached to a series of different fuselages according to what is required from the machine. Thus we have this same wing used for the Bat Boat, which was illustrated in *FLIGHT* for December 11 and 25, 1931, when flying at Hendon on the Welsh Harp; for the single-seater B.A.C. 4, which has soared for some 2 hr. 13 min.; or for the B.A.C. 7 two-seater.

Gliders in Parts

A new departure has been evolved by the company in order to meet the desire which clubs have to obtain machines in a cheap manner. This is to supply complete sets of parts from which they can build up their own machines. All these parts are finished and carefully numbered. We saw the first of these sets being packed for delivery to a member of the Portsmouth Gliding Club who is taking it out to Palestine with him. Another advantage of this method is that the cost of delivery abroad is very greatly reduced, as all the parts can, with the exception of the wing spars and longerons, be packed in one case.

During the coming summer work in the factory at Maidstone will be confined to the production of machines

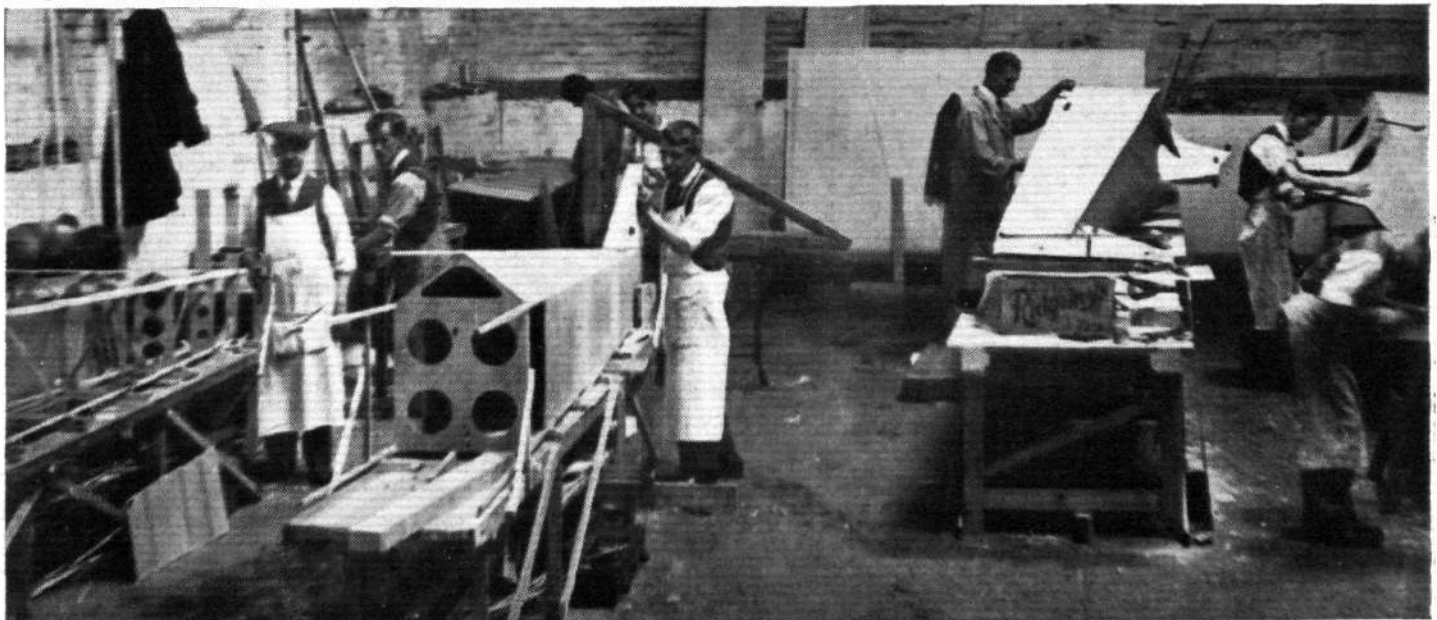
to fill actual orders, for Mr. Lowe-Wylde has undertaken to appear in connection with the tour which Sir Alan Cobham is arranging and both he and Mrs. Green will be more than fully occupied taking up joyriding passengers. Incidentally, they have now got this down to a fine art, and many little improvements which they have learned from experience will be incorporated in their latest outfit. On the car a new type of towing drum will be used which can be controlled by a brake and which is driven by a small electric motor for rewinding the towing cable immediately the aircraft has cast loose. On the aircraft will be both air brakes and wheel brakes, thus enabling Mr. Lowe-Wylde to land, when necessary down wind, with safety, and so obviate having to be towed back to the starting point.

A Miniature Sailplane

The B.A.C. 9 is built in an extremely simple manner, and although not yet out of its experimental stage, it certainly looks as if it should be exceptionally suitable for club use where it is necessary to dismantle the machines before they can be accommodated in small hangars. There is not the slightest doubt that gliding is going to grow in popularity, for it is the first and obvious stepping stone to flying power-driven machines. Already we have had evidence of this where three different gliding pilots without previous knowledge of flying power-driven aircraft have been taken up and in ten minutes' instruction or so have arrived at a point which would have taken the normal pupil several hours' dual instruction to reach. Gliding must therefore undoubtedly be looked upon as a source from which the flying schools proper will be able to draw their pupils.

LINEN AEROPLANE FABRIC

"SINTONA" is the trade name of the fabric used largely in the aircraft industry, being sold through-



GLIDERS IN THE MAKING: A corner of the B.A.C. factory at Maidstone. All the men employed here are experts in working ply-wood.

out the world by J. W. Gates & Co., Ltd., 133, Oxford Street, London, W.1.

In the development of metal construction, linen aeroplane fabric has not been eclipsed by metal sheeting for covering wings and fuselages. Metal sheeting and linen fabric both have their advantages, but one can assume that as long as British aircraft designers favour the biplane over the monoplane, fabric will hold favour as the covering material. Fabric scores in its lightness, its cheapness, and ease of repair. It also renders periodical inspection of the internal structure more convenient.

Quality and Manufacture

For aircraft purposes the fabric must be made of fine long flax fibre, dew- or water-wetted, and the yarns must be spun wet. Before the yarns are boiled they must have leas and twists of the following values:—

| Yarns | Leas | Tolerance on Leas | Twists (turns per inch) |
|----------|------|-------------------|-------------------------|
| Warp ... | 85 | ± 5 | 16 to 18 |
| Weft ... | 100 | ± 10 | 17 to 20 |

The weight of the yarn on boiling must be reduced $7\frac{1}{2}$ to $12\frac{1}{2}$ per cent. A plain weave is necessary and the fabric must be uniform and as free as possible from slubs, snarls, knots, loose ends and other defects of preparation, spinning, weaving and finishing. The selvages, which are the edges of the fabric, are woven so that they do not unravel. After weaving the fabric is beetled, and a specimen is tested for beetling in the following manner. It is secured over one side of a strong rectangular frame, 10 in. by 10 in., so that it is stretched under a tension load of 2 lb. per in. warp and 2 lb. per in. weft, both warp and weft being parallel to the sides of the frame.

Five coats of cellulose acetate dope are then applied to produce an increase in weight of 2 oz. per sq. yd. The first coat has to dry in not more than

1 hr., and show no wet translucent patches or bubbles at the end of that period. Each of the remaining four coats must dry in half-an-hour. Finally, the completely doped fabric specimen must show a uniform surface, free of discoloured patches and bubbles. It must also, at this juncture, conform to a specified degree of tautness.

Size-Softening Agent Test

A test of the size-softening agent or lubricant chosen for the purpose of dressing the warp in the fabric has to be made by the following method. The agent must be tallow, palm oil or Japan wax, free from paraffin wax and other added unsaponifiable matter.

The selected sample must be melted in a dish to render it homogeneous and then 0.1 gramme is mixed with 10 cc. of cellulose acetate dope and allowed to stand until all the air bubbles have risen. Next it is transferred to a petrie dish, an equal volume of dope is poured into another petrie dish, and the time taken for the contents of each dish to evaporate is noted. If the dope containing the size-softening agent produces a film containing air bubbles or takes appreciably longer to evaporate the size-softening agent must not be used.

Strength Test

The fabric is manufactured to a width of 36 in., upon which an allowance of plus or minus $\frac{1}{2}$ in. is permitted. Its weight, including the normal regain (12 per cent.), has not to exceed 4 oz. per sq. yd. The strength factor required is a breaking load of not less than 90 lb. per in. width of warp and weft and the strength test is conducted as follows: From each roll of fabric manufactured 12 specimens are cut, six in the direction of the warp and six in that of the weft. Each specimen is $2\frac{1}{2}$ in. wide with its end threads frayed out from

each side to reduce the width to 2 in. A specimen is soaked in water for half-an-hour, wrung out and then placed as quickly as possible between the jaws of the testing machine so that the unstretched length is not less than 7 in. The load is then applied at the rate of 180 lb. per min. It is possible to appreciate the large quantity of aeroplane fabric in demand from the fact that a light aeroplane requires 100 sq. yd., while a large machine like the de Havilland "Hercules" wants clothing with 750 sq. yd.

AERODROME CONSTRUCTION

AERODROMES are a specialised business, and their construction and maintenance requires considerable knowledge not possessed by the average type of man who is otherwise competent to level and drain tracks of land. When the "En-Tout-Cas" Co. (Syston), Ltd., enlarged their landscape department to cope with aerodrome work, Mr. R. H. S. Brown first of all toured all the principal aerodromes and landing grounds of Europe by air and then made an extensive trip in America and Canada in order to gain, at first hand, as much knowledge of the subject as possible. Mr. Brown also learnt to fly himself, in order that he might better appreciate the difficulties from the flying point of view (incidentally he is one of the hard-working secretaries of the Leicestershire Aero Club), so it may confidently be said that the En-Tout-Cas Co. is peculiarly competent to undertake constructional work in connection with aerodromes. The side with which they have had considerable success is the building department, which deals with the construction of hangars and clubhouses. They have erected hangars on the aerodrome of Ratcliffe belonging to Mr. W. Lindsay Everard and also converted two farm cottages on the aerodrome, making them suitable for housing the pilot-in-charge. Early last year a large clubhouse was designed for Phillips & Powis, Ltd., at Reading aerodrome, and this was completely erected ready for occupation in the short space of 13 weeks. This somewhat palatial building was described in FLIGHT for May 22, 1931. At Heston a tea verandah for the public was erected to the design of Mr. Graham Dawbarn and was also completed in very quick time. A further development showing the go-ahead policy of this company is their provision for extended payment schemes in connection with clubhouses, hangars and aerodrome work done for flying clubs. This is an admirable idea, for it is certain that many flying clubs are unable to provide large sums, and the provision of such arrangements for their benefit must undoubtedly result in further work for the Company, and with this end in view they are prepared to extend the scheme to any flying club or any approved person connected with the aviation business in Great Britain.



AERONAUTICAL SEAMSTRESSES: A corner of the D.H. shops showing girls covering aeroplane fuselages with fabric.

BRITISH INDUSTRIES FAIR

AERIAL PHOTOGRAPHY.—Aero-films, Ltd., Bush House, London, W.C.2, will be exhibiting at the British Industries Fair, and their display will be a series of aerial photographs of industrial properties, factories, municipal undertakings for town planning, and regional zoning. There will also be small examples of their survey work, which will be small replicas of the original maps usually prepared to a scale of 25 in. to the mile. An example of the type of survey done by this company to be shown at the Fair will be that undertaken for the London Electric Railway for their new extension from Finsbury Park to Cockfosters.

The United Steel Co., Ltd.—Large show cases containing specimens of steel sections and plates, wires and cold-work steels, drop forgings and small stampings, will be shown by the United Steel Companies, Ltd. The many companies included under this heading will all be showing their own particular product, whether it be special alloy steels, as those produced by S. Fox & Co., or the heat-resisting steels shown by B. Doncaster & Sons.

Cellon, Ltd., Kingston-on-Thames, will be exhibiting their Cellulose Lacquers suitable for use on metal, wood, and, in fact, every possible type of surface, at the British Industries Fair, Birmingham. Under the trade name of "Cerric" these lacquers have established for themselves a reputation of being entirely dependable under the worst conditions. Dope for taughtening and preserving the fabric covering of aircraft is another of the products of the Cellon factory, and it will be remembered that a full description of the manufacture of this was given in FLIGHT for January 17, 1930. An entirely new finish, being exhibited for the first time, is that which is made from synthetic gums, and is therefore capable of being much more scientifically manufactured than are vegetable-oil type varnishes. This finish has a particular application for aluminium alloys, and, also a feature that makes it very suitable indeed for seaplane and flying-boat work, this is its very high resistance to sea water.

PRINCE OF WALES' APPOINTMENT

A WARRANT of appointment has been received by the Dunlop Rubber Co., Ltd., as rubber-tyre makers to the Prince of Wales. A Royal Warrant to the King is already held by Dunlop.

WILD BARFIELD

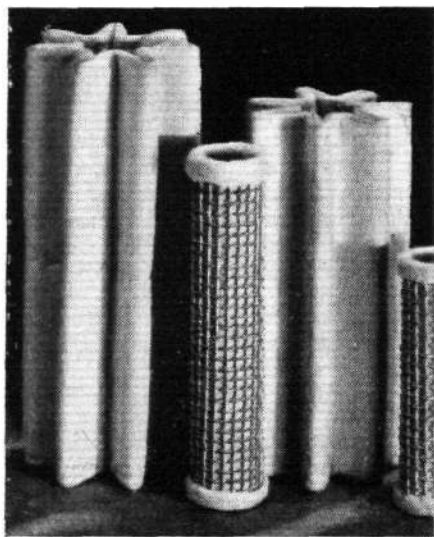
THE VICKERS Works Projection Microscope will in future be distributed by Wild Barfield Electric Furnaces, Ltd., of Holloway, London, E.7, and manufactured by Cook, Roughton & Sims, Ltd., Broadway Court, S.W.1, who also hold the selling rights.

PRATTS AT BIRMINGHAM

FAWLEY REFINERY, which was described in FLIGHT for June 6, 1930, is the source from which a very large number of products of the Anglo American Oil Co. originate, and many of these will be shown at the British Industries Fair, Birmingham, from February 22 to March 4. All types of paraffin, fuel, Diesel and vapourising oils will, of course, be seen on the stand, while of those most interesting to aircraft users are the various grades of Pratt's motor spirit. Of equal interest, perhaps, are Pratt's lubricating oils which are blended in England. There are one or two quite interesting points about Pratt's which are, perhaps, not generally known. Amongst their claims are that they were the first company to distribute petrol throughout the country; the first to employ and standardise the two-gallon petrol can and the first to introduce the petrol pump. Since their inception over 40 years ago the Company has, of course, grown steadily, and over 8,000 British men and women are now employed by them. It is also, perhaps, worth while remembering that both the world's speed record in the air and the world's land speed record were obtained in machines whose engines were driven by Pratt's special Ethyl petrol.

SPARTAN-HERMES ABROAD

THE FOLLOWING cables speak for themselves with regard to the excellence both of the Spartan aircraft and the Cirrus Hermes engines:—"Cirrus Engines, Croydon.—Have today completed 60,000 flying miles' tour, South Africa. Hermes engines in three 'Spartans' behaved magnificently. No trouble whatsoever. What arrangements are you making



FOR OIL CLEANING: An excellent oil filter, the Tecalemit, was described in "Flight" for January 15. At that time we were not able to publish an illustration of the filter element itself. This can now be seen above. The special felt is sewn on a galvanized wire frame allowing ample filtering area. The small cylindrical filters are the kind used on motor-cycle engines.

regarding return of spares? None used.—SKYWORK."

"Spartan Aircraft, Cowes, have today completed comprehensive tour, Union South Africa. All three 'Spartans' flown 60,000 miles without mishap or replacement in all conceivable types weather conditions, and from terrible aerodrome. Performance of aircraft amazing—wonderful tribute to robustness and efficiency of construction.—SKYWORK, Cape Town."

A SUPER HELMET

FLYING HELMETS which are to be used for long-distance, altitude, or night work, must of necessity be of a particularly comfortable and highly protective form in order that the pilot may not suffer any discomfort from cold or other causes. The Binley Speed Helmet, which has been designed and produced by Burch's, 33, Bedford Street, W.C.2 (Temple Bar 7861), is probably one of the best for use under such trying conditions. It is particularly designed to fit snugly round the neck, while the chin strap is of ample proportions, thus protecting the chin as well as the rest of the head. A point of interest in this helmet is that the whole of the back may be opened by the operation of a Zip fastener, and if desired the helmet may be removed by this means alone, thus ensuring that the helmet will fit correctly when it is put on again without further adjustment of the chin strap. It is made from black waterproof chrome leather and lined with chamois leather, thus providing warmth while at the same time being light and comfortable to wear.

TITANINE SATIN FINISH

PRIVATE OWNERS of aircraft are more and more frequently demanding a finish on their machines comparable to that we are now accustomed to seeing on the highest class motor cars. The Titanine satin finish produces this desired result, and a number of "Puss Moths" have recently been turned out by the de Havilland Co. finished in this style. Almost any colour or combination of colours can be obtained and the use of this doping scheme produces an exceptionally smooth and satin-like sheen on the fabric. "Titanine" products for this country are manufactured at Hendon, N.W., from which factory they are exported to many parts of the world; not all, however, for there are also Titanine factories in New Jersey, U.S.A.; Milan, Italy; Bremen, Germany, and The Hague, Holland, while in Canada Titanine is manufactured under licence by International Paints (Canada), Ltd., of Montreal. Such an organisation, therefore, ensures that standard Titanine products can be obtained in any part of the world. The head office of the London factory is at 166, Piccadilly, London, W.1, to which address inquiries or special problems which may have arisen in connection with the finishing of aircraft should be sent.

RUGBY FOOTBALL

Royal Air Force v. Royal Navy

THE Navy beat the Air Force at Twickenham on Saturday, February 13, by two goals, one penalty, and three tries (22 points) to one goal (5 points). On Saturday four men who belong to either the Navy or the Air Force were absent in Dublin playing for either England or Ireland. The Navy were without their fly-half, Elliott, and two forwards, Evans and Webb, all playing for England, while the Air Force had to surrender to Ireland their (and her) captain, the great George Beamish, who is probably the best forward now playing in any country. Probably, on paper at least, the loss of the Air Force was the greater, though in the actual run of the play the Air Force forwards did so well that it is doubtful whether the presence of George Beamish would have made much difference.

It was generally expected that the Navy would win a comfortable victory over the R.A.F., whose form in club matches this season has not proved them to be a very great side. That expectation made the run of the game on Saturday all the more surprising. It was a surprise that the Air Force should lead by 5 to 3 at half-time; but when they had done so well at first, it was doubly surprising that they should go down so very badly in the second half. The final result justified the prophets, but the game itself almost confounded them. It was a great and exhilarating game to watch.

The explanation seems to be that the Navy outsiders did not find their true form in the first half. But the Navy wing three-quarters could easily outpace Hodder and Manton, with the result that, when either of the latter got the ball, a score did not look very likely; while in the second half every movement by the Navy third line boded danger to the Air Force lines. The only R.A.F. runner who ever gave the Navy any frights was Coote. They found him uncommonly hard to stop, and his judgment in running has much improved since last year. But when he ran he was almost always on his own. The R.A.F. backing up left much to be desired. Williams played a brilliant individual game, but he and Coote did not work together at all well. In fact, the R.A.F. three-quarter line was not a well-oiled machine.

At scrum half the Navy held an advantage. Delap did many good things for the Air Force, but his passing out from the scrum was slow, and not too accurate, and when he ran himself he lacked the pace to get far. Odbert played well enough, but was very well marked. His passing to the men behind was not too good, and when the passes were good they were not too well taken. Finally, there was the difference between the full backs. In coolness and steadiness there was not a great deal between Sellar and Ievers. But length in his kicks to touch is Sellar's great virtue, and an absence of that length is Iever's great fault. He can kick the ball far enough, but it always crosses the touch line too soon. Practice, one would think, could cure that fault.

Group Capt. H.R.H. the Duke of York (one of the heroes of Jutland) was present to see the struggle between the two Services to which he has belonged. Early in the game Coote gave the Navy a fright, but Lee got away with a long run down the left wing, and the ball went across to Lane, who scored in the right corner. Forrest missed the kick, and the Navy led by 3 points after only a few minutes' play. The Air Force pressed, and usually got the ball in the scrums, but the passes out went anywhere except where they should have gone. A free kick was given to the Air Force, and Coote placed the ball exactly in the centre of the ground, and had a splendid shot at goal. It was quite straight, and not short by very much.

Then the Navy attacked, and forced the Air Force to touch down. Suddenly we saw Coote dribbling very fast. He got clear of the press, picked up as he went, and commenced a wonderful long run from about halfway. He had made his opening, and the defence was spreadeagled. Man after man tried to reach him and tackle him, but his weight and dash shook them all off, and though he was visibly tiring and slowing up, he just reached the line and hurled himself over with a couple of Navy men hanging round his waist. It was a glorious try, and Williams kicked the goal, thus putting the Air Force ahead.

Spurred on by finding themselves in the lead, the Air Force forwards kept up the pressure. The Navy passing

at this stage was as bad as that of the Air Force, and there was no sting in their movements. The Air Force forwards worked up to the Navy line, and Reynolds and Christie in turn made great efforts to force their way over. The ball went over the line, and the Navy touched down. Presently the ball went to Lane, who ran strongly down the right wing, and it took a very good tackle to save the R.A.F. lines. Half-time came with the Air Force leading by 5 points to 3.

The Second Half

The Navy forwards went off with a rush, and Benson had a jinking run which ended by his passing to an Air Force man. Play was in the Air Force 25 when Coote suddenly went off with another run. He started by selling a dummy, and broke clear. Sellar dived at his ankles, but Coote side-stepped and left the full back lying all by himself on the grass. But Coote had too far to go. Speedy foemen, unencumbered with the ball, caught him up, and there was nobody to take his pass. Good backing up then should have meant another score.

About five minutes later, when Delap was trying to get the ball away from a scrum, a Navy man got round very smartly on to him. From the Press box it looked very like an offside tackle, but the whistle did not go. The ball was passed to Lane, who ran very fast down the right wing and scored in the corner. Forrest converted with an extremely fine kick, and the Navy led by 8 points to 5.

This was the beginning of the end. Shortly afterwards the Navy three-quarters found their form. Ievers was fielding a punt when Lee followed up hard and shoved him into touch, about the R.A.F. 25 line. Almost immediately the Air Force was penalised for lying on the ball in front of goal, and Forrest made no mistake about adding another 3 points with the penalty kick. It was now 11 to 5 against the Air Force.

A rush by the Air Force forwards ended in the ball being kicked dead, and soon after an exchange of kicks between the full backs brought the Navy to the halfway line. The Navy then heeled and an absolutely perfect movement by their three-quarters sent Lane in for another try. The Air Force simply could do nothing against such work as that. It was the best football seen so far that afternoon. Forrest missed this kick. Then the Air Force defence broke down, and the Navy ran about as they liked. Benson indulged in an absolutely comic run, to and fro, not getting anywhere, but absolutely uninterfered with. He ended with what looked like a very futile drop at goal. With a few minutes to go, Sellar hurt his knee badly, and had to be carried off the field on a stretcher. Lee was put back in Sellar's place, and Hodgkin came out of the scrum to play on the left wing.

The Navy kicked straight down the field, and the ball bounced right away from Ievers. That was sheer bad luck. The Navy forwards swarmed down to the line, and Forrest's weight and strength carried him over for a try, which he could not convert. It was now 17 to 5; but worse was in store for the Air Force. Benson made a right good run, and passed just at the right moment to Hodgkin. Surely, we thought, a forward playing substitute on the wing should not be too much for the R.A.F. defence! Hodgkin, however, thought otherwise. He ran like a three-quarter, shook off a half-hearted attempt to tackle him, and scored a try. Forrest kicked another goal, and brought the Navy score up to 22. The Air Force XV must have been quite glad to hear the whistle go for no side.

F. A. DE V. R.

The teams were:—

Royal Navy.—Lt. K. A. Sellar (*Victory*); Sub. Lt. H. J. F. Lane (*Restless*), Lt. D. St. C. Ford (*Dolphin*), Surg. Lt. L. C. Benson (*Victory*), Lt. T. S. Lee (*Dolphin*); Mid. J. S. W. Walsham (R.N.E. Coll.), Sub-Lt. G. Webster (*Champion*); Mid. E. G. Nixon, Lt. J. C. Bacon (*Furious*), Marine E. Light (R.M. Plymouth), Lt. J. W. Forrest (*Royal Sovereign*) (capt.), Lt. J. J. Casement (*Excellent*), Sub-Lt. R. S. Hawkins (R.N.E. Coll.), Sub-Lt. G. C. M. Falla (*Dryad*), Lt. R. K. Hodgkin (*Renown*).

Royal Air Force.—F./O. G. M. Ievers (58 B.S.); Flt. Lt. F. S. Hodder (Henlow), P./O. P. B. Coote (Cranwell), L. A./C. S. Williams (Boscombe Down), P./O. G. A. L. Manton (Digby); Flt. Lt. R. V. M. Odbert (Uxbridge), F./O. M. V. Delap (Henlow); Corpl. M. G. Christie (Waddington), F./O. G. E. S. Williams (58 B.S.), Flt. Lt. B. V. Reynolds (Leuchars), F./O. H. A. Constantine (C.F.S.), Sergt. J. Lewis (Uxbridge), Flt. Lt. H. L. Patch (Bircham Newton), P./O. G. E. Valentine (Digby), and F./O. C. Beamish (Gosport).

THE ROYAL AIR FORCE

London Gazette, February 9, 1932.

General Duties Branch

The follg. Pilot Officers are promoted to the rank of Flying Officer:—J. S. Hamilton (March 13, 1931); C. E. J. Baines (Jan. 26); W. E. Hooper (Jan. 27); D. C. T. Bennett (Jan. 28).

Lt. H. M. King, Flying Officer, R.A.F., ceases to be attached to the R.A.F. on return to Naval duty (Jan. 3); Flying Officer D. Carr resigns his short service commission (Feb. 8); Squadron Leader H. W. Woollett, D.S.O., M.C., resigns his permanent commission (Feb. 3); Flying Officer P. F. Luxton relinquishes his short service commission on account of ill-health (Feb. 10); Sub.-Lt. I. W. Gwynne-Evans, R.N., Flying Officer, R.A.F., relinquishes his temporary commission on return to Naval duty (Jan. 30).

Medical Branch

R. L. Raymond, M.B., Ch.M., F.R.C.S.(E.), is granted a short service commission as a Flying Officer for three years on the active list, with effect from and with seny. of Jan. 25.

PRINCESS MARY'S ROYAL AIR FORCE NURSING SERVICE

Staff Nurse Miss E. K. Wright is promoted to the rank of Sister (Jan. 10).

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The follg. Flight Lieutenants are granted commissions in Class A, in their present rank, on relinquishing their commissions in the Auxiliary Air Force:—G. W. H. Wallcousins (Aug. 3, 1931); W. R. Massey (Aug. 28, 1931).

Pilot Officer on probation W. D. T. Gairdner is confirmed in rank (Jan. 10).

The follg. Flying Officers are promoted to the rank of Flight Lieutenant (Feb. 10):—J. B. Stockbridge, F. W. M. Downer, A. M. D. Howes, P. G. Lucas, M. R. Edmondson, G. A. V. Tyson, R. C. Edwards, K. E. Parker.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Group Captain C. H. K. Edmonds, D.S.O., O.B.E., to No. 1 Air Defence Group Headquarters, and attached to Air Ministry (D.D.M.), 1.2.32.

Wing Commanders: W. H. de W. Waller, A.F.C., to R.A.F. Depot, Uxbridge, for Administrative Duties, 1.2.32. A. H. S. Steele-Perkins, O.B.E., to No. 1 Air Defence Group Headquarters, and attached to Air Ministry (D.P.S.), 1.2.32.

Wing Commanders: G. W. Murlis-Green, D.S.O., M.C., to Headquarters, Inaldu Area, Stanmore, for Air Staff Duties, 26.1.32. E. H. Sparling, A.F.C., to Air Armament School, Eastchurch, for Armament duties, 30.1.32. F. H. M. Maynard, A.F.C., to Headquarters, Iraq Command, Hinaidi, for Personnel Staff Duties, 26.1.32.

Squadron Leaders: O. C. Bryson, M.C., D.F.C., A.M. to Central Flying School, Wittering, 28.1.32. W. A. C. Morgan, M.C., to No. 22 Group Headquarters, South Farnborough, 28.1.32. D. Colyer, D.F.C., to Central Flying School, Wittering, 11.1.32. H. E. P. Wigglesworth, D.S.C., to Headquarters, Air Defence of Great Britain, 1.2.32. E. B. Grenfell, A.F.C., to Headquarters, Wessex Bombing Area, Andover, 1.2.32. B. K. D. Robertson, A.F.C., to No. 1 Stores Depot, Kidbrooke, 1.2.32.

Flight Lieutenants: W. M. Fry, M.C., to No. 216 Squadron, Heliopolis, Egypt, 15.1.32. D. D'A. A. Greig, D.F.C., A.F.C., to R.A.F. Depot, Aboukir, Egypt, 18.1.32. A. H. Montgomery, to Headquarters, Aden Command, 8.1.32. J. H. Edwards-Jones, to No. 208 Squadron, Heliopolis, Egypt, 21.1.32. G. D. Daly, D.F.C., to Headquarters, Coastal Area, Lee-on-Solent, 25.1.32. M. C. W. C. Flint, M.C., to Station Headquarters, Boscombe Down, 24.1.32. C. H. Flinn, to Air Ministry (D. of T.), 21.1.32. E. R. C. Hobson, D.F.C., to R.A.F. Depot, Uxbridge, 1.2.32. D. R. Mitchell, M.B.E., to Royal Air Force College, Cranwell, 1.2.32.

Flying Officers: I. N. Roome, to No. 2 Squadron, Manston, 19.1.32. G. F. Alexander, to Headquarters, Air Defence of Great Britain, Uxbridge, 25.1.32.

ROYAL AIR FORCE MEMORIAL FUND

The following are reports of the usual fortnightly meetings of the Grants Sub-Committee of the Fund held at Iddesleigh House. At the meeting held on January 7, with Mrs. L. M. K. Pratt Barlow, O.B.E., in the chair, and Air-Commodore B. C. H. Drew, C.M.G., and Mrs. F. Vesey Holt present, 13 cases were considered and grants made to the amount of £341 6s. 6d.

At the meeting held on January 22, Mr. W. S. Field was in the chair, and the other members of the Committee present were:—Mrs. L. M. K. Pratt Barlow, O.B.E.; Air-Commodore B. C. H. Drew, C.M.G.; Mrs. F. Vesey Holt; Sqd.-Ldr. H. G. W. Lock. The Committee considered in all 12 cases and made grants to the amount of £169 15s.

At the meeting held on February 4, Mr. W. S. Field was in the chair, and the other members of the Committee present were:—Mrs. L. M. K. Pratt Barlow, O.B.E.; Sqd.-Ldr. H. G. W. Lock. The Committee considered in all 10 cases, and made grants to the amount of £120 1s. 8d.

Disbandment of No. 10 Group Headquarters

No. 10 Group Headquarters was disbanded with effect from January 18, 1932, in consequence of the transfer of Coastal Area Headquarters to Lee-on-Solent, and the following units are now administered directly by Coastal Area Headquarters:—

R.A.F. Base, Clashot.—(i) Headquarters. (ii) No. 201 (Flying Boat) Squadron. (iii) Training Squadron. (iv) Navigation School. (v) Marine Instructional Section. (vi) Embarkation Office, Southampton. (Controlled by Director of Equipment, Air Ministry).

Station Headquarters, Donibristle. (i) No. 100 (Bomber) Squadron. (ii) Accommodation for 3 F.A.A. flights.

Marine Aircraft Experimental Establishment, Felixstowe. (Controlled directly by Air Ministry).—Flying Boat Development Flight.

The follg. Pilot Officers are promoted to the rank of Flying Officer:—R. S. Gleadow (Jan. 1); W. L. Garstang (Jan. 2); G. P. Moss (Jan. 2); A. G. P. Way (Jan. 2); R. F. Egford (Jan. 3); J. H. Edge (Jan. 3); E. A. Beale (Jan. 7); S. T. R. Hemsted (Jan. 7); P. T. Stephens (Jan. 7); F. E. Cowlrick (Jan. 8); G. F. Phipps (Jan. 14); L. F. Malone (Jan. 18); R. P. S. Davidson (Jan. 19); R. M. H. Noble (Jan. 24).

The follg. Flying Officers are transferred from Class C to Class A:—D. J. Stewart (Jan. 4); G. A. Ogg (Oct. 28, 1931).

Flying Officer H. R. Turner is transferred from Class AA (ii) to Class BB (Sept. 20, 1931); Flying Officer H. C. Osborne resigns his commission (Jan. 30) Flight Lt. R. A. Seaton relinquishes his commission on account of ill-health (Feb. 10). The notification in the *Gazette* of Jan. 1 concerning Flying Officer A. S. Budge is cancelled. The notification in the *Gazette* of Jan. 12 concerning Flying Officer H. W. Roberts is cancelled.

Medical Branch

The follg. Flying Officers are promoted to the rank of Flight Lt. (Aug. 12, 1931):—W. J. Hutchinson, M.B., D. Magrath, M.B., W. A. Beck, M.B., D.P.H., M. D. Rawkins, M.B., B.S.

AUXILIARY AIR FORCE

General Duties Branch

No. 600 (CITY OF LONDON) (BOMBER) SQUADRON.—The follg. Flight Lts. relinquish their commissions on completion of service:—G. W. H. Wallcousins (Aug. 3, 1931); W. R. Massey (Aug. 28, 1931).

No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—Flying Officer R. G. Shaw, D.F.C., is promoted to the rank of Flight Lt. (Nov. 29, 1931).

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—Flying Officer A. D. McNab is promoted to the rank of Flight Lt. (Oct. 13, 1931).

No. 603 (CITY OF EDINBURGH) (BOMBER) SQUADRON.—Flying Officer I. E. C. Watson is promoted to the rank of Flight Lt. (Dec. 13, 1931).

No. 604 (COUNTY OF MIDDLESEX) (BOMBER) SQUADRON.—The follg. Pilot Officers are promoted to the rank of Flying Officer.—C. P. Gabriel (Dec. 2 1931); L. E. A. Healy (Dec. 6, 1931).

Stores Branch

Flight Lieutenants: D. W. Dean, to H.Q., Iraq Command, Hinaidi; 23.1.32. E. C. Farman and A. J. Cox, M.B.E., to R.A.F. Staff College, Andover; 18.1.32. J. Hobbs, to R.A.F. Depot, Uxbridge; 24.12.31.

Flying Officer G. Matthews, to No. 1 Armoured Car Co., Hinaidi; 23.1.32

Flight Lieutenants: W. A. Glasper and E. V. E. Andrewartha, to Aircraft Depot, Hinaidi, Iraq, 26.1.32.

Flying Officers: J. E. Reynolds, to No. 70 Squadron, Hinaidi, Iraq, 26.1.32. B. G. Pool, to Aircraft Depot, Hinaidi, Iraq, 26.1.32. A. H. E. Frost, to Aircraft Park, Lahore, India, 1.1.32.

Accountant Branch

Flying Officers: R. J. Wishlade, to Aircraft Depot, Hinaidi; 23.1.32. H. R. Withers and P. Griffiths, to Station H.Q., Hinaidi; 23.1.32.

Flying Officer J. H. Glenn, to No. 30 Squadron, Mosul, Iraq, 26.1.32.

Medical Branch

Squadron Leader J. D. Leahy, M.C., to Aircraft Depot, Karachi, India; 6.12.31.

Flight Lieutenant: J. Hill, to R.A.F. Base, Gosport; 3.2.32.

Flying Officers: F. W. P. Dixon and C. R. Palfreyman, to Medical Training Depot, Halton, on appointment to short-service commns.; 12.1.32. C. H. Smith, to No. 2 Flying Training Sch., Digby; 25.1.32. J. A. Kersley, D. C. MacGilchrist, C. A. Rumball, A. M. Weston, all to the Med. Training Depot, Halton, on appointment to short-service commns.; 18.1.32.

Flying Officer F. I. G. Tweedie, to Headquarters, Iraq Command, Hinaidi, 23.1.32.

Chaplains Branch

Rev. J. F. Cox, M.C., to R.A.F. Base, Gosport; 19.1.32.

NAVAL APPOINTMENT

The following appointments have been made by the Admiralty:—

LIEUT.-COMM. (Flt. Lieut., R.A.F.) S. T. MORGAN, O.B.E., to York, and for F.F.D. in 443 Flight (Jan. 1).

LIEUT. (F./O., R.A.F.).—G. M. PARES, to Victory, for F.F.D. in 443 Flight (Jan. 1).

R.A.F. Base, Gosport.—(i) Headquarters. (ii) Base Training Squadron; (iii) Base Torpedo Section. (iv) Workshops and Storage Section. (v) Marine Craft Section. (vi) R.A.F. Auxiliary "Aadalst." (vii) Accommodation for 6 F.A.A. flights.

School of Naval Co-operation, Lee-on-Solent.—(i) No. 443 (F.S.R.) Flight. (ii) No. 444 (F.S.R.) Flight.

R.A.F. Training Base, Leuchars.—(i) Accommodation for 2 F.A.A. flights. (ii) Novar Camp.

Station Headquarters, Mount Batten.—(i) No. 204 (Flying Boat) Squadron. (ii) No. 209 (Flying Boat) Squadron.

No. 210 (Flying Boat) Squadron, Pembroke Dock.—R.A.F. Floating Dock. R. F. units for H.M.S. *Courageous*. R.A.F. units for H.M.S. *Furious*.

20 Squadron (R.F.C. & R.A.F.) Association

The Annual Reunion Dinner of the above will be held at the Park Lane Hotel, Piccadilly, London, W., on Saturday, March 5, 1932, at 7.30 for 8 p.m. All past members of 55 Squadron who have not received a circular are requested to communicate with the Hon. Treasurer, L. B. Goodyer, "Nithsdale," 14, Egmont Road, Sutton, Surrey. The annual subscription of 10s. 6d. will admit members to the Dinner and they may bring guests at 12s. 6d. per head. It is hoped that as many as possible will make a special effort to attend this year. Officers who have recently returned from service with the Squadron in Iraq are particularly invited to be present.

Royal Naval Staff College, Greenwich

The undermentioned officers have completed satisfactorily the course at the Royal Naval Staff College, Greenwich, which terminated in December, 1931, and Wing Com. C. E. Maude is entitled to the letters "q.s." after his name in the Air Force List:—Wing Com. C. E. Maude, Sqd. Ldr. W. B. Farrington, D.S.O., p.s.a.

The Big Supermarine Boat

THE Under-Secretary for Air, in reply to a question in the House on February 10, stated that the amount already expended on the Supermarine flying-boat, the contract for which had been cancelled, had not yet been determined, but that something like 75 per cent. of the sum which would have been expended on the boat should be saved by the cancellation, and that this money would be expended on work which was considered to be more urgently necessary.

Monospar Developments

WE understand that the Fokker which has been fitted with the new Monospar wing (described in FLIGHT for June 19, July 17 and December 18, 1931) has now successfully finished all its flying trials at Brockworth and is returning to Farnborough for a series of comparative reports to be compiled after further flying there by pilots who flew the machine before the new wing was built. At the present moment, therefore, figures as to the performance are not available, but it is understood that both the climb and top speed are greatly improved, while the weight saved through the use of the Monospar principle should undoubtedly increase the pay load by no small amount.

The Airspeed "Ferry"

NEARING completion at the York works of Airspeed, Ltd., is the first of a batch of new aircraft which this firm hopes to place on the market this spring. Joint managing directors of the firm are Mr. N. S. Norway, who was recently designer of the Airship Guarantee Co. which built R.100, and Mr. A. Hessel Tiltman, for a number of years on the technical staff of the de Havilland Aircraft Co. Sir Alan Cobham is a director of the company, and we gather that it is his intention to use some of these new machines during his operations in the coming summer. The first machine to be built is to be known as the "Ferry," and will be a three-engined biplane with "Gipsy III" engines. The middle engine is mounted in the top plane, its airscrew clearing the top of the fuselage. This arrangement leaves the nose of the fuselage available for the pilot, whose view is thus exceptionally good. The "Ferry" will have a seating accommodation depending on the range desired and the degree of "luxury" demanded. The maximum number of passengers which can be accommodated is 10.

Tests on the Breda 33

TESTS have recently been made (January 29) at the Aircraft Works of the Breda Company of Milan under the official supervision of the Registro Italiano Navale and Aeronautico, and several new tests of the strength of the "Breda 33" machine are worthy of mention. It is well known that the official pay load for light machines in nearly all countries is about 660 lbs. in relation to the factor of safety admitted in the various countries; the "Breda 33" has exceeded the tests prescribed on one of the standard machines with a total weight of 1,892 lbs. to the factor of safety admitted by the Registro Italiano, which means that with a tare weight of 1,012 lbs. the "Breda 33" can officially take a pay load of 8,850 lbs. This is certainly a very remarkable result. We would point out to our readers who desire better to understand the practical results of such tests, that if the same tests had been made according to the British rules (the British official factor of safety is 1.5 less than the official Italian factor of safety), the pay load of the "Breda 33" would be still greater and the aerobatic load of 770 lbs. would be permitted.

Crowded Out!

OWING to extra pressure on our space this week, Correspondence and some other matters are unavoidably held over.

IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.
For 1912 and 1913, see FLIGHT for January 17, 1914.
For 1914, see FLIGHT for January 15, 1915, and so on yearly, the figures for 1930 being given in FLIGHT, January 16, 1931.

| Imports. | | Exports. | | Re-exports. | |
|----------|---------|----------|-----------|-------------|-------------|
| 1931. | 1932. | 1931. | 1932. | 1931. | 1932. |
| Jan. ... | £ 7,965 | £ 2,456 | £ 142,596 | £ 122,942 | £ 1,074 863 |

PUBLICATIONS RECEIVED

Aeronautics, Technical and General: Books in the Coventry Libraries. Compiled by H. Sargeant. Public Libraries, Coventry.

Seventeenth Annual Report of the National Advisory Committee for Aeronautics, 1931. Superintendent of Documents, Washington, D.C., U.S.A. Price 20 cents.

Technical Notes: No. 395, *Penetration and Duration of Fuel Sprays from a Pump Injection System.* By A. M. Rothrock and E. T. Marsh. October, 1931. No. 396, *Performance of a Compression-Ignition Engine with a Pre-combustion Chamber having High-Velocity Air Flow.* By J. A. Spanogle and C. S. Moore. October, 1931. No. 397, *The Aerodynamic Characteristics of Six Commonly-Used Aerofoils Over a Large Range of Positive and Negative Angles of Attack.* By R. F. Anderson. November, 1931. No. 398, *The Effect of Slots and Flaps on the Lift and Drag of the McDonnell Aeroplane as Determined in Flight.* By H. A. Soule. November, 1931. No. 399, *Some Characteristics of Fuel Sprays at Low-Injection Pressures.* By A. M. Rothrock and C. D. Waldron. November, 1931. No. 400, *Advantages of Oxide Films as Bases for Aluminium Pigmented Surface Coatings for Aluminium Alloys.* By R. V. Buzzard and W. H. Mutchler. November, 1931. No. 401, *Tests of N.A.C.A. Aerofoils in the Variable Density Wind Tunnel: Series 44 and 64.* By E. N. Jacobs and R. M. Pinkerton. December, 1931. No. 402, *The Effectiveness of a Double-Stem Injection Valve in Controlling Combustion in a Compression-Ignition Engine.* By J. A. Spanogle and E. G. Whitney. December, 1931. No. 403, *The Interference Effects on an Aerofoil of a Flat Plate at Mid-Span Position.* By K. E. Ward. December, 1931. U.S. National Advisory Committee for Aeronautics, Washington, D.C., U.S.A.

NEW COMPANY REGISTERED

BRITISH AIR NAVIGATION CO., LTD., 30, Conduit Street, W.1. Capital £500 in £1 shares (440 5 per cent. preference and 60 ordinary). Objects: To establish, maintain and work lines of and manufacture aerial conveyances and aeroplanes, etc. Provisional directors:—I. C. MacGilchrist, 40, Montpelier Street, S.W.7 (director of Orion Booksellers, Ltd.). A. J. Stykan, 39, Half Moon Street, W.1 (director of Speedhire Services, Ltd.).

AERONAUTICAL PATENT SPECIFICATIONS

(Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

APPLIED FOR IN 1930

Published February 18, 1932

27,708. V. EHMIG. Flying machines. (365,615.)
31,041. H. D. BLACK. Air brakes for aircraft. (265,537.)
36,660. A. HILLIER. (Sperry Gyroscope Co., Inc.) Sighting and alignment mechanism, and steering means for craft, such as bombing-aeroplanes. (365,731.)

APPLIED FOR IN 1931

Published February 18, 1932

9,006. J. A. GOURLAY and W. S. SHACKLETON. Controllable captive aircraft and apparatus for use in elementary training of pilots, or as an amusement device. (365,875.)
12,561. J. A. SANDERS and F. L. STOOT. Flying machines. (365,910.)
15,294. H. G. C. FAIRWEATHER (S. A. REED). High-speed metal aeronautical propellers. (365,940.)
17,008. H. JUNKERS. Aircraft for high altitude flight. (365,961.)
23,323. LUFTSCHIFFBAU ZEPPELIN GES. and L. DURR. Mooring and towing of airships. (365,987.)

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